FRIDAY, FEBRUARY 22, 1901.

CONTENTS

Contributions

Chilled Wheels for Heavy Service.

Buffalo, N. Y., Feb. 12, 1901.

TO THE EDITOR OF THE RAILROAD GAZETTE.

The article on cast iron wheels for heavy coal cars, which appeared in an issue of recent date of the *American Engineer*, etc., is undoubtedly based on results obtained from an ordinary quality of chilled wheel in 50-ton service, and would give the impression that all chilled wheels were subject to the same difficulties in such service.

While it is not the intention of the writer to open a discussion on the comparative merits of chilled wheels and the material from which they are made, or the practice attending their manufacture; nevertheless, the general statement made in the article referred to is not warranted by the facts and it is not right to allow a general impression to be created that chilled wheels are unfit for such service. The kind of wheels used under 50-ton cars where failures have occurred may or may not be equal to the service, but it is unfair to assume from this that chilled wheels cannot be or have not been made that would stand it.

Fifty-ton cars were first introduced on the Pittsburgh, Bessemer & Lake Erie R. R., in 1898, to carry ore from Conneaut to Pittsburgh for the Carnegie Steel Company, and as the use of such heavy capacity cars was a new project, the details of construction were carefully planned and materials of the best quality were used. No difficulty appears to have been experienced in wheel failures on the P., B. & L. E. R. R. cars. The wheels were of special quality, made under double the ordinary test requirements, and furnished at a price that admitted of the use of a proper quality of material and order of practice in manufacture. Out of 8,000 wheels put under the first 1,000 cars early in 1898, up to the present time only about 15 have been removed, and all for ordinary causes. There have been no failures through inability of the wheels to stand the service. Eight thousand similar wheels are now being placed under 50-ton cars on the same railroad.

Of late years the constant tendency has been toward lower prices and consequently the use of cheaper material in wheel manufacture, while at the same time the conditions of service have been continually growing more severe. There must be a point somewhere that will constitute the parting line between the ability to use cheaper wheels and the necessity of having wheels equal to the increasing demands of service. Perhaps the 50-ton car is the limit. If so, it will be necessary for the railroads to decide on the use of a better quality of wheel for such service and pay a price that will admit of the proper manufacture of the same. Between the lowest priced wheels and a quality suitable for 50-ton service, the difference in the cost of material and conditions of manufacture will be from one-half to three-quarters of a cent per pound. This will add, say $25, to the cost per car. It is not a large item considering the importance of the question, particularly if it secures satisfactory conditions of wheel service under such equipment. No doubt the difference can be cut from $25 to $20, $15 or $10, if the quality of the wheel is reduced accordingly, but that is simply a return to a practice which is already pronounced unsatisfactory.

It has been held by some railroad companies that in the purchase of an extra quality of wheel, there is not always the certainty of getting it, in reply to which, it may be said that if the better quality is not paid for, there is a certainty that it will not be delivered, and there is no reason why railway companies paying for better wheels should not make sure that the same are delivered. The art of making high-grade wheels has not been lost, and the knowledge of how to make chilled wheels of the best quality is still a matter of current, although not general practice, for the reason that wheels of this class have not been in great demand of late years.

The whole question seems to be one of comparative economy. It will no doubt be decided sooner or later by the users of heavy capacity cars. If accidents from the failure of an ordinary quality of chilled wheels in such service involves greater expenses than the additional cost of obtaining wheels that will stand the service, the latter will certainly be called for. The extra cost of 1,000 cars furnished with wheels that will answer the requirements, might not be equal to the loss sustained by the failure of one wheel of a quality insufficient for the service. The 50-ton car has undoubtedly come to stay and there is no more important detail of construction than the wheels. The responsibility of providing the latter of the necessary quality is a pressing one and it is surprising that it has not come up before, considering the large number of heavy capacity cars that have been constructed.

P. H. GRIFFIN,
President New York Car Wheel Works.

A part of the article referred to above follows:

"Present experience with coal and ore cars of large capacity seems to indicate that the limit of the cast iron wheel has been reached, unless a change in form is made or the wheel flanges are in some way relieved in service. The breakage of wheels, and particularly of flanges, under 50-ton cars has created a great deal of anxiety of late, and the question of the necessity of steel tired wheels for this service is now seriously raised. It has been said that the cars are too heavy and that there will be a general reduction from 50 to 40 tons as the maximum capacity....There seems to be no question of the firm establishment of the 50-ton car, and the wheels must be made to carry them. Cast iron wheels for these cars have been strengthened at the hub to the point of withstanding a wheel press pressure of 110 tons upon a mandrel, and they have, in at least one case, been increased in weight to 690 pounds for the purpose of overcoming breakages in the plates, but the breakage of flanges is not so easy to stop. The opinion that the limit of strength of the flanges of cast iron wheels of the present standard contour has been reached is growing among those having the widest experience with these cars. It seems to be necessary to increase the thickness of the flange as it stood before 1894 or to take up the steel tired wheel....Several broken flanges coming to our notice had blue fractures showing the influence of the brakes on mountain grades. This is troublesome in the East as well as in the West. It is evident that the near approach to 75 tons of car and load brings up new factors in the matter of wheels."

The New York Central's "Central-Atlantic" Engines.

Washington, D. C., Feb. 11, 1901.

TO THE EDITOR OF THE RAILROAD GAZETTE.

Through the courtesy of Mr. Van Etten the General Superintendent, I had the privilege of riding on 2,980, described so fully in your issue of Feb. 1, from New York to Albany on the worst day this winter. We had two extra cars on, which very materially increased the wind area and the pressure of steam required to heat the train, besides the very strong northwest gale blowing the snow off the river on the rails gave an excellent opportunity for observing the working of the novel fulcrum for increasing the tractive power. This device proved exceedingly satisfactory and worked splendidly, enabling the driver to avoid using his sand at any point on the trip. It seemed equally satisfactory in its effects at any speed, and seems to be a decided step in the increase of tractive power without having additional pairs of wheels coupled together. The way 2,980 maintained her steam with the throttle absolutely wide open, 90 lbs. of steam going back to heat the train, and the fire-box doors on the latch only, was a remarkable testimony to the extreme efficiency of this new design in steaming powers.

The other novelty, the air operated water scoop, worked twice then failed at Hyde Park, and then acted again, though coming down on No. 50, Empire State Express, on no occasion did it work. When it did work it certainly was an improvement over the hand-operated one.

The number of stops was unfortunate, as had we not been stopped twice beyond Poughkeepsie the driver was confident of arriving before his booked time. However, the stops gave an excellent test of the engine's powers, and we only took, excluding the time actually spent in the stops, 3 hours 6 minutes, while we certainly lost 16 minutes by the loss of time in starting and stopping, leaving 170 minutes, or an average speed of 50.4 miles per hour. When it is remembered that almost every other train lost from 35 minutes to 2 hours on the run that day, the splendid performance of 2,980 stands out as one of unexcelled merit.

On the run back I was in the cars, and from Poughkeepsie in to New York the driver ran with the lever almost in the center, to save his water, or else he would have made an even better run than he did.

This engine has been running perfectly cool, and was barely three weeks old when I rode on her. She is a credit to her designer, and a great step in advance over the former locomotives owing to the increased size of her boiler. The log follows. B. A.

New York to Albany—Southwestern Limited; 10 Cars, 500 Tons. Central-Atlantic Type Engine No. 2,980. Strong N. W. Gale. Temperature 17 Deg. in the Shade Out of the Wind—February 5, 1901.

Miles.		Due.	Running	
	Grand Cen. Sta., dep..	1: 0	1: 6: 0	
4.38	125th St., arr..	1: 9	1:14:45	
	dep.	1: 9	1:16: 0	
5.3	Mott Haven Junc. p.....		1:18:40	Slow.
11.15	Spuyten D'l p..		1:26:30	Slow.
15.22	Yonkers p.....	1:29	1:31:20	
25.28	Tarrytown p....	1:29	1:44: 0	
30.9	Sing Sing p.....		1:51: 0	Water. Slow.
41.9	Peekskill p.....	1:59	2: 9:40	Stop near Montrose; hotwater uncoupled.
49.86	Garrison p.....	2:11	2:20: 0	
58.98	Fishkill		2:30:15	
63.11	New Hamburgh		2:36:40	
69.4	Poughkeepsie, arr..	2:41	2:45:30	
	dep..	2:43	2:50: 0	
79:25	Hyde Park, arr.		2:58:40	Water scoop failed to work.
	dep.	2:51	3:11: 0	
89.08	Rhinecliff p....	3:03	3:24: 0	
104.50	Germantown p.		3:42:30	Water. Slow.
114.45	Hudson, arr....		3:53:15	Hot water hose uncoupled.
	dep....	3:37	3:56: 0	
124.27	Stuyvesant p...		4: 9:15	Slow.
142.39	Rensselaer p...	4:13	4:35:30	Slow.
142.88	Albany, arr.....	4:15	4:37: 0	Stop near Castletown. Slow.

Albany to New York—Empire State Express; 4 Cars, 210 Tons, Engine No. 2,980.

Miles.		Due.	Running.	
	Albany, dep....	7: 0	7:22: 0	
.49	Rensselaer p...	7: 2	7:24:20	
28.43	Hudson p.....		7:56:30	Slack.
63.63	Hyde Park p...		8:32:40	Slow to pass 2d 14, and water.
69.4	Poughkeepsie, arr..		8:40: 0	
	dep..		8:46:30	
83.9	Fishkill p.....		9: 1:50	
101.59	Peekskill p.....		9:18:10	
108 46	Croton p.....		9:25:40	
117.6	Tarrytown p...		9:33:45	
127.66	Yonkers p.....		9:42:50	
131.73	Spuyten D'l p..		9:46:50	Slow.
137.58	Mott Haven Junc. p.....		9:54: 5	Slow.
142.88	Grand Central Station 10: 0		10:20:00	

Conneaut Harbor Ore Docks.

[WITH AN INSET.]

In the *Railroad Gazette* for Dec. 21, 1900, was published an account of the method of handling traffic on the Pittsburgh, Bessemer & Lake Erie R. R., in which a reference was made to the docks at Conneaut Harbor, where the ore trains are made up, and from which the bulk of the traffic of the road is obtained. The docks are owned and operated by the Pittsburgh & Conneaut Dock Co., a corporation independent of the railroad company, though both are under the same financial control.

Conneaut Harbor is situated on the south shore of Lake Erie, 28 miles west of Erie and 57 miles east of Cleveland, at the mouth of Conneaut Creek. The harbor is almost entirely artificial. The flats on either side of the creek readily lend themselves to the formation of the harbor and docks, and the necessary dredging has been done.

A general plan of the whole property is shown in Fig. 1. From this it will be seen that the strip available for the harbor is quite narrow on the lake front, but broadens somewhat back of the bluffs that face the water. A panoramic view of the harbor and works is shown in the photographic view, Fig. 2.

The entrance channel lies between two piers built by the government. It has a width of about 200 ft. and a depth at mean low water of 20 ft. At the outer end of the western pier the government maintains a lighthouse with a range light at the shore end. The docks run down to the shore and in the first line, known as Dock No. 1, there is an accommodation for three vessels having a length of 500 ft. each. This dock is served by unloading machines of the cantilever type built by the Brown Hoisting & Conveying Machine Co., of Cleveland. They are shown at (1) in the left foreground of the panoramic view in Fig. 2. There are 17 of these Brown "Bridges," also 6 King bridges, as they are called, each with a traverse of about 250 ft. The details of the operation of this and other portions of the plant will be considered later.

At the upper end of the Dock No. 1 is a ferry slip for the car ferryboat, the "Shenango," which is used for ferrying cars across Lake Erie to Port Dover, Port Stanley and Rondeau, the traffic being mainly in coal. Near this point are also the offices of the superintendent of docks, the repair shop, power stations, hospital and storehouses. Some of these buildings can be seen in the center foreground of Fig. 2. No. 2 is the hospital; 3, a storehouse; 4, the machine shop. The other buildings of the picture are not on the dock property, but are on the edge of the bluff that lies between the observer and the docks.

South of this point a slip has been dredged to 20 ft. below mean low water and a width of 166 ft. This slip affords a frontage of 1,088.6 to Dock No. 2 and 1,030.6 ft. to Dock No. 3.

Dock No. 2 is equipped with eight McMyler rapid unloaders which appear at 5 in the panoramic view. Opposite on Dock No. 3 there are 19 revolving crane hoists (6) built by the same firm, and further out there is a McMyler car dump (7) for loading coal directly into a tender or vessel. At this point Conneaut Creek crosses the dock line and cuts off Dock No. 4 from the balance

of the property. This dock is equipped with three Hulett Automatic Unloading Machines (8) as made by the Webster, Camp & Lane Co., of Akron, Ohio.

This completes the tour of the property which, with its management, can now be taken up in detail.

First in the matter of unloading ore from the vessel to the storage piles or cars: As the open season on the lakes does not include the whole year, and as the unloading facilities at the docks are greatly in excess of the capacity of the railroad to handle the tonnage so unloaded during that open season, it is necessary that storage should be provided. To meet this requirement there is a space on Dock No. 1 where about 600,000 tons of ore may be stored during the summer. This dock is, therefore, arranged so as to meet the double condition of unloading from the steamers directly on to the cars as well as upon the storage piles. The unloading bridges used for this purpose are similar in general design to those used for the removal of material on the Chicago Drainage Canal. They are built by the Brown Hoisting & Conveying Machine Co., of Cleveland, Ohio, and by the King Bridge Co., of Cleveland, Ohio, and consist essentially of two traveling towers carrying a bridge overhanging the ship to be unloaded upon one side and the tracks and ore piles upon the other. At Conneaut there are 17 of these Brown and 6 King bridges, each having a bucket traverse of 250 ft., so that the ore can be deposited at any point that may be desired.

To facilitate the handling of the ore at this point, ample track facilities are afforded, which, when the storage piles have taken on their maximum proportions in the fall, as shown in Fig. 3, are buried deeply beneath the accumulations of the season's work. Some of the tracks must, however, be kept clear for the direct loading into the cars and facilities must be afforded for the rapid and economical handling of the same. The method used to increase the weight of ore in the piles and at the same time protect a track from encroachment, is clearly shown by the cribwork of ties that is used facing the track in the foreground. The machines in the distance are the Brown conveyors, by which all of the ore shown has been handled and rising beyond the uprights, by which the water-end overhangs are raised, are the masts of a steamer at the docks.

As, with the appliances in use, cars are loaded with great rapidity, it would require several switching engines to keep the cars properly placed; for the machines there is employed a system of rope haulage that extends over all of the docks. This system, as applied to Dock No. 1, can be readily traced as it is clearly indicated by dotted lines in Fig. 1a.

In the building occupied by the machine shop there is a haulage engine driving two wire cables; one running out from either side. These cables travel at the rate of about two and a half miles an hour and are laid above the ground between the tracks, where they are readily accessible. They are used for moving the cars to and from the unloaders. A chain with a hook at one end for catching on the oil box and a grip at the other for taking hold of a wire rope serves as a means of connection between the car and the cable. The shifter walks alongside holding the grip and, when the car has reached the desired point, the grip is released and the car stopped.

With this arrangement it is merely necessary for a switching engine to place a line of empty cars on a siding within reach of the cable, when they can be moved to be loaded and then hauled to a point where the switching engine can remove them in train lengths instead of being obliged to care for individual cars. The service is, therefore, more economical both in first cost and in operation than it would be were locomotives used, besides making it possible to put cars in the desired position more rapidly than could be done with the ordinary method of yard handling.

As already stated, the same method is followed on all of the docks except No. 3. For Dock No. 2 the haulage house is located at the head of the ferry slip and operates two cables. Both run down the line of the dock; one lying wholly between tracks 1 and 2, so that cars thereon can be moved in either direction. The other runs down alongside track No. 3 and returns between Nos. 5 and 6. The line extends beyond the limits of the slip so that the cars can be taken well out of the way of the unloading machines before it is necessary to call in the services of a switching engine.

On the opposite side of the harbor, Dock No. 4 is equipped with a rope haulage that serves storage tracks located at a distance from the water. The haulage house stands close to the bridges over Conneaut Creek and operates two cables. One runs down and back between the tracks at the water edge, while the other follows, the siding, used for car storage, around a loop and returns up the wharf line, beneath the Hulett unloading machines. Thus, empty cars are run in on the storage tracks at the eastern end of the loop by switching locomotives and then need no more attention from that class of motive power until they have been loaded and are ready to be placed in the southbound trains.

The unloading at Dock No. 2 is done by what is technically known as the Direct Unloading Machine made by the McMyler Manufacturing Co., and which goes locally under the name of the "Fast Line." This plant consists of eight of these machines having in all twelve travelers and operating as many buckets. Each machine is entirely self-contained and is independent of the others. It is provided with its own engine house, elevated above the tracks, and containing a locomotive form boiler with the engines, clutches and other machinery essential to the rapid handling of the ore buckets. Each machine is

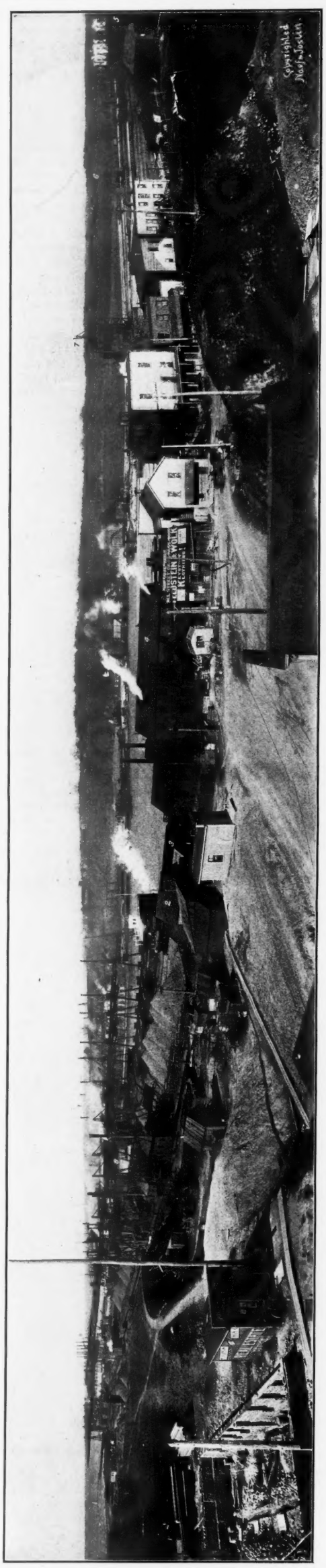


Fig. 2.—A Panoramic View of Conneaut Harbor and Docks.

carried on six legs at the bottom of which there are wheels running on special rails laid on heavy timber stringers as shown in Fig. 5. One rail is laid close to the edge of the wharf, and the other between the second and third lines of rails. In Fig. 5 can also be seen the cables used for hauling cars. The machines are moved by gearing that drives the carrying wheels and, by this means they can be adjusted so as to stand in any desired position with reference to the hatches of the ships.

Extending out from each side of the main frame are booms. On the land side these booms cover three tracks and on the water side are of sufficient length to extend to the outer side of a ship of 40 ft. beam lying alongside. In order that they may not interfere with the handling of the ship when making a landing or getting under weigh they can be raised to a vertical position as shown in Fig. 4. Where there are two lines of booms on the same machine, one or both can be adjusted along the wharf line so as to meet the requirements of the hatches of the ship to be unloaded.

This machine is a hoisting and conveying machine, pure and simple. Its work consists in hoisting a bucket of ore from the hold and carrying it to a point above the car to be loaded, where it can be dumped. Each line of booms requires three men. One operates the controlling levers of the machinery a second is stationed at the hatch of the vessel to give the necessary signals to the operator and the men in the hold, and the third is on the car to trip and dump the bucket. The average working time required to take a bucketful of ore from the bottom of the hold of a vessel, deliver its contents on the car, return the empty bucket to the hold and attach to the next is one minute. This is ample to provide for all delays other than those of shifting the whole machine. Each bucket will average a trifle more than a ton capacity, so that the plant is capable of unloading ore from the boat to the cars at the rate of 12 tons a minute, or 720 tons an hour, or about 7,000 tons in a shift of ten hours. As a matter of fact, a vessel during the past season entered the harbor between 6 and 7 o'clock one morning with a load of between 6,000 and 7,000 tons of ore. At 7 o'clock in the evening she had been unloaded, provisioned, coaled and cleared and started on her return trip to Lake Superior.

As already mentioned this plant merely handles the ore buckets. The latter are loaded by hand by shovelers in the hold, who are employed at each hatchway in sufficient numbers to keep up with the pace of the machines.

On Dock No. 3 there are arrangements for both loading and unloading vessels. These consist of 19 revolving self-contained dock cranes, each containing its own engine and boiler. They are mounted on wheels resting on a special line of rails running along the edge of the wharf and are especially valuable for loading material such as rails and shapes from the cars into the hold of a vessel. As they cannot compete in rapidity of operation with the machinery on the other docks in the handling of ore from ship to cars, they are only used for this purpose in cases of emergency.

On this same dock (No. 3) there is a McMyler car unloading machine, an excellent representation of which is given in Fig. 6. A similar machine, though differing in details, used in connection with the ore dock at Ashtabula, Ohio, was described and illustrated in the *Railroad Gazette* for Sept. 7, 1894, so that it is unnecessary to republish a complete description in detail at this time. The reader's attention is merely called to the fact that the machine is intended to receive a car loaded with bulk freight, such as coal or ore, to raise it and turn it into the position shown in the engraving (Fig. 6) whereby the contents are dumped bodily into the hopper, whence they run through the chute to the vessel alongside. The machine is capable of working at the rate of about one carload in two minutes which, for cars of 80,000 lbs. capacity, would give a rate of 20 tons a minute.

This particular machine is used exclusively for cars coming in from the south loaded with coal. This coal is used either for shipment or for fueling ships. In the former case the vessel is brought alongside and coal delivered directly into the hold. Where the coal bunkers only are to be filled, it is the ordinary custom to do this with the coaling tender "Alice Richards" that is shown alongside the machine in the illustration. This tender is provided with bins and a swinging crane hoist from which a bucket is shown suspended. In order to save time and enable a vessel to take on coal while discharging her cargo the "Alice Richards" is used. The method of handling the cars at this car-unloading machine is a combination of gravity tracks and cable haulage. The loaded cars are set in on tracks Nos. 26, 27 and 28 at A. Those tracks are so elevated that there is a sharp down grade from their junction to the water's edge. The cars are set free one at a time and allowed to run down without control to a point where the track joins that leading to the unloader. Here the cars encounter a steep incline and are at once brought to a standstill. The track rises over a shelter in which a bumping car attached to a cable is located. When the car starts to roll back down the ascent, which stopped it, a man on the unloading machine throws a clutch into the cable-operating mechanism and the bumping car emerges from its shelter and following the car, comes against its rear bumper and pushes it up on to the platform of the unloading machine. The bumping car is then hauled back beneath the shelter at the "kick-up" to await the arrival of the next car. While the car is ascending the incline towards the machine it passes beneath a sprinkler by means of which the coal is wet down, so that there is no trouble with the dust, that would otherwise be in-

tolerable in the confined space of the operating house of the unloading machine.

We now cross Conneaut Creek to Dock No. 4, on which are examples of the latest development of machines for the rapid handling of ore from ship to cars. These are the Hulett unloading machines as made by Webster, Camp & Lane, of Akron, Ohio, and they are illustrated by Figs. 7 and 8. There are three of these machines on Dock No. 4. They are operated by hydraulic power and every movement is under the control of the operator. Two men are required; one is the engineer and fireman and the other is the operator, though, as a matter of fact, a third is employed as a general overseer.

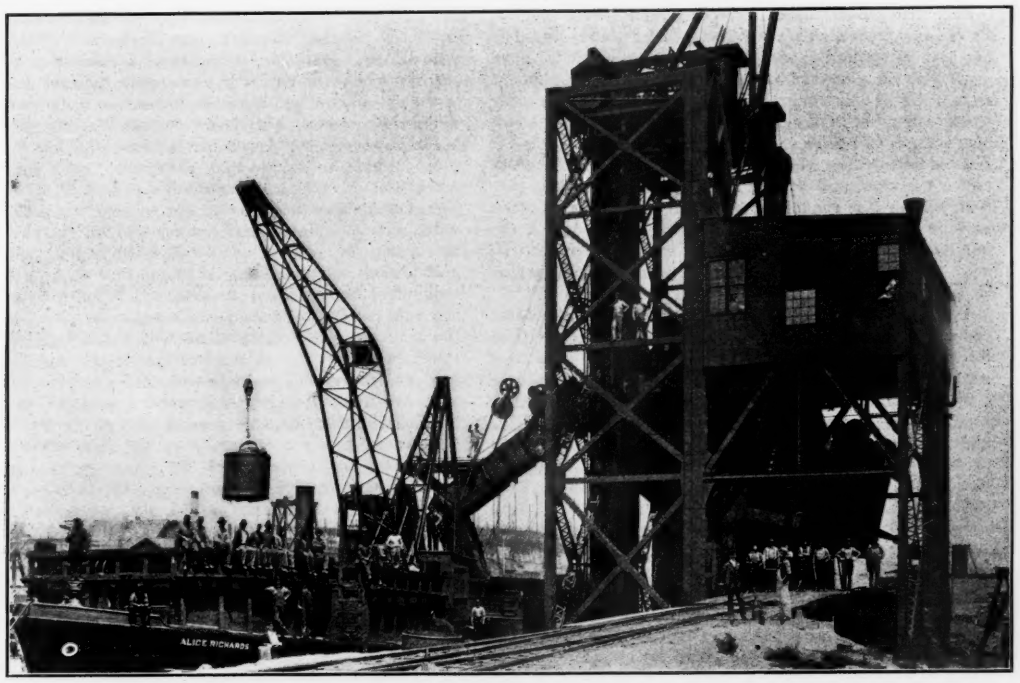


Fig. 6.—McMyler Car Unloading Machine.

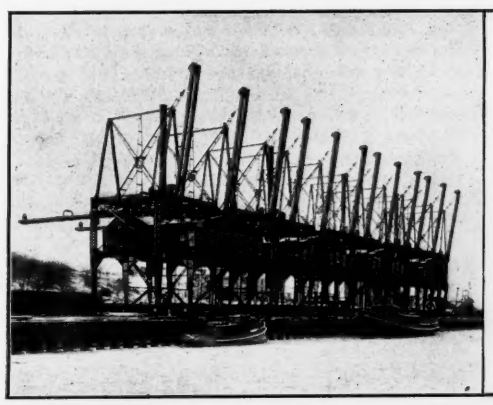


Fig. 4.—McMyler Direct Unloading Machine, from Water Front.

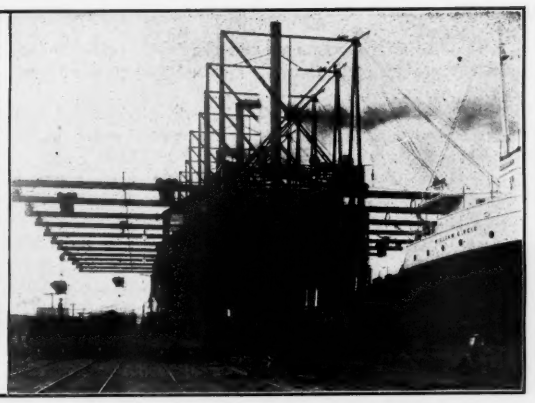


Fig. 5.—McMyler Direct Unloading Machine Showing Tracks.

The work is done by means of a clam-shell bucket that is lowered into the hold, where it loads itself and is then raised and run back over the cars, opened to allow the load to drop and then returned to the hold. Since the erection of the machine the shape of the bucket has been changed and the round contour of the bottom is made nearly square. The operator is stationed inside the vertical hanger at the point marked A in Fig. 7. He is thus close by the working bucket at all times and can control the motions of the same with the utmost delicacy. Indeed, it cannot fail to be a matter of surprise to anyone, who watches the work of the machine for the first time, to see how sensitive it is to the will of the operator and how the bucket can be moved in and out among the closely spaced stanchions in the hold of a vessel.

The method of getting down into the hold will be clearly understood by a comparison of Figs. 7 and 8, in which the bucket is shown in the raised and lowered positions respectively. The vertical hanger is capable of being turned through a complete revolution so that the bucket can be adjusted to any position needed in order to do its work when below. The buckets are opened and closed by hydraulic cylinders in the vertical connection and the latter is rotated by a small cylinder in the head.

The large overhead rocking arm is carried by trunnions on a carriage, B, and is operated by a cylinder taking in and paying out the ropes C that are attached to the main frame of the carriage. Its own weight tends to tip it down into the hold but the overbalance is partially counterbalanced by weights that reduce the vertical pressure from 27,000 to about 7,000 lbs.

The traversing of the carriage is accomplished by means of an hydraulic cylinder that has a tackle connected therewith similar to that used for multiplying the stroke of an hydraulic piston on an ordinary elevator. The hydraulic pressure is furnished by a Worthington pressure pump set in a small cabin behind the girders of the main frame and which does not appear in the engraving. As the major portion of the water is used on the rocking arm, a large steam accumulator is placed on the inner end thereof at D as shown in the engraving, the steam and water being carried to it through the jointed pipes on the sides. The boiler is located in the cabin at the right and is of the locomotive form capable of carrying a pressure of 160 lbs. per sq. in.

The whole structure is carried on two lines of rails so laid that its bridge spans four lines of tracks, upon any one of which it can do its loading. These tracks make it possible to move the machine to any point along the dock that may be desired in order to set it in line with the hatches. This traversing is done with a steam engine so connected by gearing as to drive the carrying wheels in the manner shown at the left of Figs. 7 and 8.

The operation of these machines is very fast though the actual motion of the parts seem quite deliberate when compared with those of the "Fast plant." The buckets have a capacity of 7½ tons and can be reckoned to take up a full load at each trip until they are obliged to scrape around and clean up in the bottom of the hold when they will raise from 4½ to 5 tons on each trip. The time occupied in average working enables each operator to deliver one bucketful of ore upon the cars every two minutes, so that the combined capacity of the three machines can be taken as, at least, 10½ tons per minute or about 6,000 tons in a working day of ten hours. More complete details of these machines will be published in a future article. The combined ore handling capacity of the machinery on the three docks thus reviewed may be taken at about 20,000 tons per day.

What precedes covers the system of handling ore from the ship to cars and it now remains to pass in brief review the other work that must be done in order that the confusion and delay may be avoided.

When a ship has been despatched from the Superior ports with a cargo of ore, the probable date of her arrival is at once known at Conneaut and orders are received, before her arrival, as to the destination of the ore that she is carrying. When this is known, arrangements are at once made for her berth. If the ore is to be held in storage, she is unloaded by the Brown or King machines. If the ore is to be shipped at once, it is loaded into cars and hauled off about as rapidly as the ship is cleared.

After being loaded in the cars, the latter are hauled by the switching engines over the scales at the upper end of the yard where each carload is weighed, after which it is put into a train and backed into one of the tracks leading off from ladder track No. 8. From this point it is in charge of the road engine. The switching and making up of the trains in this yard is done by the engines of the Pittsburgh, Bessemer & Lake Erie R. R., work that is in no wise different from the switching operations of other yards.

In addition to its inbound traffic, Conneaut also bids fair to become an export harbor of no mean importance. Besides the export of coal to Canada on the steamer "Shenango," already noted, there have been four cargoes sent direct to Europe during the past season by way of the Welland Canal and St. Lawrence River. These cargoes were composed of rails and shapes from the Carnegie mills at Pittsburgh, which are thus practically brought within a little more than 150 miles of a seaport. During September, 1900, the total export trade of the port was 330,228 tons, the total for the six months ending Sept. 30 being 1,772,945 tons. The inbound tonnage during the whole season was 2,659,746 tons, of which 2,556,631 tons was iron ore.

It would not be doing justice to the great transhipping industry that has been created at Conneaut Harbor if no allusion were to be made to the correlated matters that are controlled by the Pittsburgh & Conneaut Dock Co. Conneaut is not a large place and the harbor and docks are about two miles from the business center of the town. They have, in fact, created their own surroundings and their own settlements. They employ on an average about 1,300 men during the season, and naturally the majority of them are not of the quietest and most law-abiding character. Add to this the crews of from four to seven vessels, carrying from 10 to 25 men each, that are in harbor at once, there is given a community that contains the germs of considerable disorder. In fact, there was a time when the docks were not the safest place for the stranger to frequent at night. These conditions involved the formation and maintenance of an efficient police force. The docks are now under surveillance day and night with an experienced officer in command, and they are now as safe at night as the streets of any city.

The number of men employed and the character of the work done renders the total avoidance of accidents involving personal injury well nigh impossible. So a small emergency hospital has been established, in which every provision is made for aid to the injured. This department is in the immediate charge of a surgeon who devotes his whole time to such work as may be demanded of him on the premises, and by the employes at their homes.

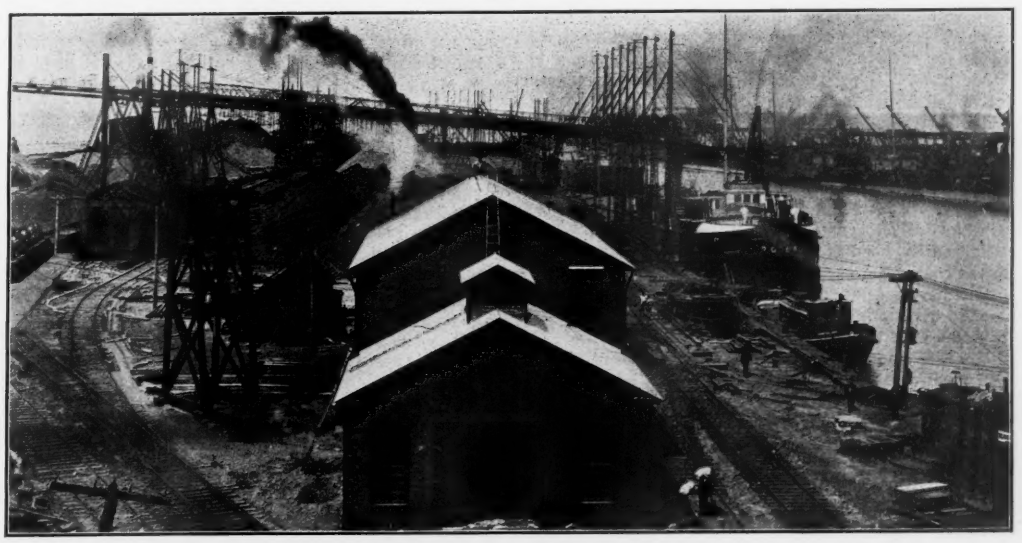


Fig. 9.—View of Ore Piles and Brown Hoist.

For the convenience of the vessels a general store is maintained in which about everything that can be required on board ship is held in stock. There are cold storage rooms for fresh meat, and from this the whole

gamut of provisions is run. Of course, there is everything that can be demanded in the way of ship chandlery and stores. So that a master on entering port has merely to go to the store at the head of Dock No. 1 (the Lake Erie Supply Co.) and order such supplies as he may need. These are at once loaded on a bumboat, propelled by a naphtha engine, and taken alongside. A similar order for coal is filled by the "Alice Richards" with the result that, brief as the time of discharging may be, the vessel will be fully coaled and provisioned before this can be done.

The machine shop is fitted for doing all of the ordinary repairs required by the machinery of the docks as well as minor repairs needed on board ship. In order that such work may be done without delay a stock of iron and steel is kept on hand, together with such supplies as pipe, fittings, packing and the like.

An industry like this where so many men are employed and where an inextricable confusion would quickly follow on the heels of any local mismanagement requires that all parts of the property shall be quickly accessible, and for this purpose a naphtha launch is kept moored near the ferry slip to carry officers and messages to any point that may need attention.

The Conneaut Harbor industry is still new, it having been opened for traffic in the fall of 1892. Its rapid growth and the traffic that it handles are of course due to rather unusual conditions, but that it is a profitable venture for its owners is evidenced by the fact that the plant is being constantly enlarged and that the capacity of the Pittsburgh Bessemer & Lake Erie R. R. will be increased to meet it. So, as the tonnage handled in 1900 was greater than that of any preceding year the first year of the new century will no doubt establish a record that will surpass the last year of the old.

The Chemistry and Heat Treatment of Steel Rails.*

BY WILLIAM R. WEBSTER.

Opinions still differ widely concerning the requirements, chemical and physical, which should be expressed in specifications for steel rails, in order to secure results satisfactory to both manufacturers and purchasers.

Sir Lowthian Bell is reported as saying last summer, at the London meeting of the American Society of Civil Engineers, that "as he had been 25 years a manufacturer of rails, and 25 years a director in the North Eastern Railway, he represented both maker and user, and he had at his disposal 35,000 analyses to go upon, in making deductions. From these he could prove, and disprove, everything that could be said for or against any composition of a rail, a facility beloved by the expert."

The analyses and tests referred to by Sir Lowthian Bell are, no doubt, similar to those in many of the records we have in this country. The reason of the chemical composition of some of the rails not being in accord with the physical tests could, in many cases, be accounted for if we had a full history of the manufacture of the blows of steel in question. In other words, the heat-treatment of the steel has not been recorded, and the chemical composition alone will not account for all the differences in results observed in tests made or on the rails in use. For instance, a rail of inferior chemical composition finished in rolling at the proper temperature, will give better results than a rail of good chemical composition, finished in rolling at too high a temperature. Again two rolls of equally good chemical composition, one having high carbon and the other low carbon, finished in rolling at the same temperature, may give very different results in service, or under the drop test. Suppose the finishing temperature to be right for the low carbon steel, it may be too high for the high carbon steel, and give a poor rail.

Notwithstanding these differences all will agree that to make the safest and best wearing rail, you must start with a uniform steel of good chemical composition and roll it under the proper conditions of heating, reduction and finishing temperature.

The section of the rail has a direct bearing on the finishing temperature, as the large mass of metal in the head carries the heat much longer than the thin metal in the flange and web. I have for some time advocated putting more metal in the flanges and web of our heavy rails, in order to carry the heat, and allow the work of rolling on the head at a low enough temperature to break up the coarse grain, and produce a tough structure.

Another important point to be considered is the proper amount of carbon required in different sections of rails to produce the best results. It is generally admitted that a moderate amount of carbon, with enough work at a low temperature to produce toughness and hardness, will give better results than higher carbon steel finished in rolling at a higher temperature. The latter method is often used, without fully appreciating the trouble one may get into by doing so. As the carbon is increased, the danger of a large grain being produced in the steel by finishing at a high temperature is very greatly increased. When you consider this in connection with the large mass of metal in the head of our heavier rails and the thin metal in the flanges and web, you have a difficult problem, and it is not to be wondered at that rails rolled under these conditions do not always give satisfactory results.

Another important matter is to have a satisfactory check on the finishing temperature of the rails. It is not of much use to say that the rails must be finished at a dull red or any other particular color, as opinions differ as to just what a dull red is, and in the daytime it certainly looks very different than at night. The best check we have is a simple one that I have advocated for some time, that is, the amount of shrinkage that takes place in a 30-ft. rail from the time it is cut at the hot saw until it reaches the normal temperature. Just how many inches it is proper to allow could be easily decided by experiment, and introduced into the specifications.

The structure produced by too high finishing temperature is not thoroughly understood, and the drop test has not been recognized as the most important check we have on it. It is a rather crude test in one sense, but in another it is more valuable than a tension test, particularly on material that has been finished at too high a temperature in rolling. A drop or shock test will develop brittleness in cases where a fair elongation may be given under the slow pull of the testing machine. I consider that a drop test should be made on every blow of steel, as it is the most satisfactory test we have to check the quality of the finished rail, and it will show up brittleness due to inferior chemical composition, or to improper heat treatment.

The Carnegie Steel Co., by their new method of rolling, are finishing their rails at a lower temperature than formerly, and getting better results from same section of rail with steel of same chemical composition.

Some years ago, investigators who tried to show the relations, in soft steel, between its chemical composition and physical properties, became discouraged and gave the problem up as the results were so conflicting. This is now well understood, and allowances made in the physical requirements for material rolled into different thicknesses, and the finishing temperature is carefully controlled. From the chemical composition of the steel, the tensile strength of the finished product is predicted, and the steel rolled into finished product without losing the initial casting temperature. In rails we have exactly the same problem before us, but in some respects a more difficult one, owing to the section to be rolled and the higher carbon steel used.

I would offer for discussion the points above referred to:

First. The advantages to be gained by using more metal in the flanges and web of the heavier sections of rails.

Second. The advantages and disadvantages of using a higher carbon steel than that called for in these specifications.

Third. The amount of shrinkage in a 30-ft. rail to be determined and specified as an accurate check on the finishing temperature in rolling.

Fourth. The advisability of making a drop test on each blow of steel.

I appreciate that it is not only the finishing temperature that must be considered, but that sufficient work must be put on the steel at a low enough temperature to break up the coarse structure and produce the tough steel desired. This is recognized by some who are rolling rails direct from the ingot, and they claim that better results are produced by this method than from reheating the bloom. This might be considered another point for discussion.

*From a paper [illegible] at the Richmond meeting of the American Institute of Mining Engineers.

Finishing Temperatures for Steel Rails.*

BY ROBERT W. HUNT.

There are certain physical characteristics of steel resulting from its treatment while being formed into useful products which have been, and are well known to its manipulators; but under the stress of business competition and other controlling influences, all knowledge is not always given either full sway, or even full acknowledgment; it has been so in the case of steel rails. It is an universally acknowledged fact that steel rails of heavy sections made during the last ten years have not given as good service as the rails of lighter sections produced before that time. While certain fundamental principles of steel making have been acknowledged, their application to steel rail manufacture has been, if not actually denied, completely ignored. . . .

While venturing to particularize some of the recorded instances of my elaborations of the importance of the physical treatment of steel during its manufacture into rails, I do not wish to, for one instant, imply that others have not also maintained the same position. . . . But it came to pass that my statements were given more attention than they probably deserved, and that must be my excuse for referring to them. But mere words never did accomplish anything, and no matter how much or how often any of us wrote and spoke, so long as the rail makers did not act, unsatisfactory rails continued to be furnished to the railroads.

As the rush of the modern mill and its tremendous production seemed to preclude the possibility of obtaining rails rolled at lower heats, I advocated trying to obtain from chemical composition that which could not be from physical treatment; and, so urged harder steel in proportion to the increase of section. And good results have come from such mixtures; but I have always insisted, and do now, that the chemical composition is secondary to the physical treatment of the metal. There have been instances in the experience of many railroad engineers, where they have obtained excellent service from steel rails which were made in the earlier days, whose chemical analyses revealed the fact that they had neither good or even consistent chemical character. They were high in carbon and low in carbon; high in manganese, and low in that element; high in phosphorus, and higher in phosphorus, and so on; but they all yielded good service.

*Presented at the Richmond meeting, American Institute of Mining Engineers.

Early in 1895 the Pioneer Rail Renewing Co. was organized to develop and operate the process of renewing steel rails, which had been invented and patented by E. W. McKenna. He had been during his whole business life an operating railroad man, and as such had been impressed by both the tremendous expense attached to the rail part of maintenance of way, and the comparatively short service obtained from the majority of rails, not always because they broke or wore out, but because they became so rough that they were unfit for main track use, or their ends battered and had to be cut off. This latter procedure was expensive, and when the rails were put back into service, they did not give a good track, both on account of an increased number of joints and because of mismating of the rails. So long as the roads had branch lines or sidings laid with iron rails, the rails from the main track could be used to replace the iron ones, for which there was a constant market; but he foresaw that as the sections on the main line increased in weight, and the subsidiary lines were laid with steel heavy enough and good enough for their requirements, the companies would be left without a market for the heavy sectioned worn out rails. These considerations led to his scheme for renewing rails and restoring them to their original service in main line tracks.

The Pioneer Company rented the old North Chicago rail mills of the Illinois Steel Company, the mill, by the way, in which the first steel rails rolled in America were made. Here rails were renewed on experimental orders from several different roads. It required time to demonstrate by service the success or failure of the rails.

From the first, I had maintained that the renewed rail would wear better than a new one, basing my belief upon its receiving more work, and that at a low temperature. The rails gave such good results that more capital was raised, and the McKenna Steel Working Company organized, which built a new rolling mill at Joliet, Ill. This was followed by another at Kansas City, Mo., and I believe, one is soon to be erected in the vicinity of New York. Thousands of tons of rails have been renewed, and are giving satisfactory service, and I believe the success of the McKenna renewed rail has had more to do with the commercial recognition of the heat and work principle than all of our talk and writing. It was an actual demonstration on a scale which could not be ignored.

The officials of great railway companies were restive in their dealings with the rail makers. Commercial conditions became such that there could not be any question of the rail business yielding profits; therefore, buyers felt free to demand better goods. Several of the rail companies recognized the inevitable and prepared plans for the alteration of their rail mills. Notably the Illinois Steel Company and the Carnegie Steel Company. The latter have carried their plans into execution, and are to-day rolling rails in their modified mill. All is working well, and I have no doubt as to the better quality of their rails so manufactured. I believe the Cambria Steel Company have taken steps to equip themselves on the same lines, and no doubt others will soon do so.

The Pennsylvania Railroad Company made it a part of their rail contracts for this year, that the rails must be finished at a low heat. This naturally brought up the question of what constituted such a heat, and how it should be determined.

Representing as I do the Pennsylvania Lines West of Pittsburgh in their rail inspection, I was consulted, and I recommended the use of Lunette pyrometers. This led to a series of heat observations with such an instrument, the results of which I shall give. It may be that the Ducretet & Lejeune pyrometer does not give the exact heat degrees but from my observations I feel certain it does yield consistent results. If it does that, it will be all that is required. Mr. Thomas Morrison, General Superintendent of the Carnegie Steel Company's Edgar Thomson Works, and who planned and executed their mill alterations, thinks that the distance between the hot saws, which is found to yield a rail of the desired length, will be a sufficiently accurate and practical controlling factor as to the heat at which the rail is finished, and I concur with him; but also think the Lunette pyrometer will assist, and always give quick results.

As observed by such an instrument, the heat at which rails of 80 lbs. to the yard were finished under old conditions in most rail mills averaged 1,795 degrees Fahrenheit. In the Edgar Thomson mill under existing conditions the following observations were made, and have been followed by many others, on 80-lb. American Society section rails, and also on the lighter sections with similar results.

Temperature of partially formed rails when first placed on cooling tables:

Degrees Fahrenheit: 1,742, 1,772, 1,772, 1,742, 1,772, 1,772; average, 1,762.

Temperature of finished rail on leaving the rolls:

Degrees Fahrenheit: 1,600, 1,600, 1,574, 1,574, 1,574, 1,574, 1,574, 1,600; average, 1,580.

The rails remained on the cooling table about 1 minute 13 seconds, the longest time observed being 1 minute 20 seconds, and the shortest 1 minute 6 seconds. It was

found that the saws, to yield an 80-lb. rail 30-ft. long when cold, had to be set quite 1 in. nearer together than under the old practice.

In the Joliet McKenna renewing mill I found that the average temperature at which the rails were drawn from the reheating furnaces was 1,750 degrees Fahrenheit. As the rails left the finishing rolls their average temperature was 1,480 degrees Fahrenheit. It will be noticed that this was less than the Edgar Thomson average, and I believe as the difficulties which surround all new manufacturing steps are overcome, the latter works will finish a little cooler. But this can be overdone. If the steel is too cold it will spring the rolls, receive no work on its interior structure, and so be unsatisfactory. While this can be easily theoretically understood, Mr. Morrison has demonstrated it by actual work.

Messrs. Morrison and Julian Kennedy have united in a patent covering the handling of the rails while on the intermediate or cooling bed, the gist of which covers the placing of the head of one rail against the flange of another, and so on. The head of the outside rail to be first entered in the finishing pass is exposed, but the bottom of its flange is against the head of the next rail. The theory is that the flange being thinner its heat will pass off quicker and it will thus draw heat from the head of the rail lying against it, and so not only remain longer at a temperature sufficiently hot to roll, but by so doing give more time for the heat to pass off from the head of the rail, which, as stated, lies exposed. When that rail is entered in the finishing rolls, of course, the head of the next one, and which had been against its flange, becomes exposed, and so on.

I am happy to say that the new method of rolling at the Edgar Thomson mill does not interfere with its large product. In other words, the production is now quite as large as before its introduction, but the wear of the finishing rolls is greater, and it must be harder on the hot saws. The rails are finished free from scale, and the steel shows more elasticity under the cold straightening presses. The fracture of the rails is much closer—that is, the grain of the steel is much finer than in rails of the same section rolled under the old practice. Such metal must offer greater resistance to abrasion.

There are two rail mills at the Edgar Thomson Works. On the older one, rails of light sections are rolled. At the time of my observations of the finishing temperatures of the 80-lb. rails, 40-lb. ones were being made on the old mill. The blooms for these were taken indiscriminately from the heats of steel which went into the 80-lb. rails. It was found that the average finishing temperature of the 40-lb. rails was 1,780 degrees Fahrenheit. As the size of the original blooms for both rails was the same, it follows that the light sections received the greater amount of work, but, as stated, the last, or finishing work, was performed at a higher temperature.

I had rails of both sections nicked and broken, and found the grain of the 80-lb. rail to be finer than that of the 40-lb. one. This, to me, is a convincing demonstration of the effect of work applied at low temperatures.

New Sections.—It is with great hesitation that I venture to suggest new rail sections, and, perhaps, the very fact of having been not only a member but the Secretary of the Committee of the American Society of Civil Engineers on "Standard Rail Sections," whose labors resulted in the recommendation by that society of what are now the practically recognized American standards. ought to make me hesitate all the more, but, on the contrary, I think the knowledge gained in that position gives me the necessary courage to open the question.

I regard the described rail rolling practice as a revolution in steel rail making, and as such it justifies that which would have been unnecessary under other conditions. Now that the makers have modified their rolling practice, it is but wise for railroad engineers to modify their rail sections, so as to obtain the best results from such practice, and in doing this at the same time adopt sections which will be the best for renewing, while adhering to all of the essential features of the sections recommended by the American Society Committee.

Some railroad officials may not be prepared to admit that renewing is to be considered, but I venture the assertion that when the time comes for the necessary removal of the heavy sections from tracks, renewing of them will force itself upon their favorable consideration. At all events, if we adopt a section, which is: First, The best for the original manufacturer of the rail. Second, Will give satisfactory results in service, and, third, Is good for renewal, it would seem as though we had acted wisely.

The American Society sections, as they are commercially designated, have made their way until they are practically the standard ones of the country. All roads do not use them, but the majority do. Therefore, they should be regarded as the basis on which new sections are to be designed. I would not advocate changing the 80-lb. section, or those below it, but I do think in view of the coming manufacturing conditions, the heavier sections can be advantageously altered.

The greater the area of metal in the head of a rail, the longer it will take while lying on the intermediate table for the heat to pass off, and if sufficient time is not given the less will be the "fining" effect of the finishing pass; and the length of time which the rail can remain on the table depends on the temperature of the flange. The thinner it is, the more rapidly will it cool, and hence, as stated, its condition controls.

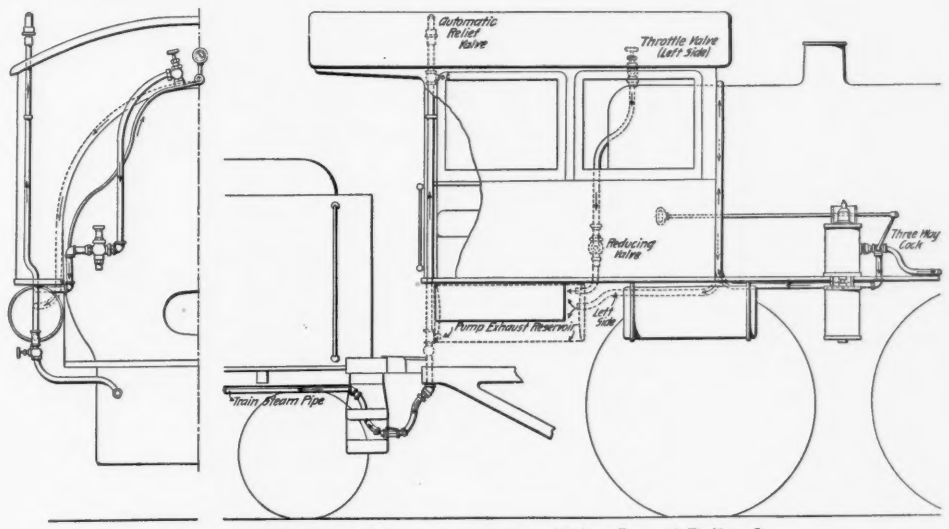
Therefore, I think it will be well to design new sections for 85, 90, 95 and 100-lb. rails on lines adapted to this heat condition, and which will also be best for renewal into lighter sections.

In American railroad practice, rails are not permitted to remain in main lines until the wear of metal from off the top of their heads has exceeded ¼ in. Side or curve wear is another matter. Logging roads, and other usual customers for relaying rails, cannot afford to buy them of such heavy sections. It certainly will not be economy to consign them to the scrap heap. Renewing them certainly will be true economy, and it can be confidently expected that the rails will be improved by each renewal.

I believe that the existing committee No. 4, on Rails of the Engineering and Maintenance of Way Association, is the proper body to prepare the sections, and hope they will do so.

Heating Passenger Trains With Exhaust Steam from the Air Pump.

The Maine Central Railroad has been using, for the past two winters, a system of heating passenger trains with exhaust steam from the air pump. A three-way cock is placed in the exhaust pipe immediately in front of the pump, a handle for operating the cock being placed in a convenient location in the cab. When the handle is pushed forward, exhaust from the pump passes directly to the stack or saddle. When the handle is pulled backward, all exhaust steam from the pump is discharged through a pipe, of the same size as ordinary exhaust pipe, directly into a reservoir under the cab, hung like the auxiliary reservoirs.



Air Pump Exhaust Steam Heat Piping—Maine Central Railroad.

The reservoirs on the larger class of engines are about 20 in. x 40 in., and are carefully lagged and jacketed to prevent rapid condensation. Leading out of the reservoir, slightly above the bottom, is the outlet and connection for the train steam pipe, passing under the tender to the heating system. There is also a connection from the reducing valve and boiler, directly into the reservoir. Controlling the reservoir pressure is a relief valve located on top of the cab, adjusted at the maximum pressure required to be carried in the heating system. In operating this device with heavy trains the live steam reducing valve is set at the minimum desirable pressure and the exhaust steam from the air pump is turned into the heating system. If the pump furnishes pressure in excess of what is required to suitably heat the train, the surplus is vented to the atmosphere through the relief valve. If the pump does not furnish sufficient steam for heating purposes, and the pressure thus falls below what the reducing valve is set at, the boiler, through the reducing valve, will automatically make up the deficiency. By this means all heat coming from the pump may be utilized for heating purposes and the boiler is merely called on to make up the deficiency, where formerly it was called on to supply all heat used for this purpose. With local trains, and even with express trains in moderate weather, there is, as a rule, no need of opening up the boiler supply, as the pump furnishes an abundance. It has been found in practice that this method results in a marked economy in the consumption of fuel without being in any way detrimental to the air-brake system.

At the January meeting of the New England Railroad Club this method of heating was taken up for topical discussion. The history of experiments in exhaust heating, made on the Maine Central since 1899, was given in a paper by Mr. Frank Coggin. From the paper and its discussion a few extracts are here given:

"As to the effect of the appliance on the air pump, there are many who have the impression that this back pressure would block the pump and that trouble would be experienced in maintaining the proper air pressure for the brake. Were this true in the least it would be a fatal objection, as no railroad could or would for a moment allow anything to impair the efficiency of the brakes, for the saving in heating might be much more than offset by losses in other directions.

"Let us look at what we are requiring of our air pumps; under former conditions the total resistance that the pump had to overcome (minus the friction) was usually ninety pounds main reservoir pressure. To this we now add a back pressure of, say, thirty pounds. These two make a total resistance of 120 pounds to be overcome, and our boiler pressure is ample to do this. In fact, on the largest ten-wheel engines used on the Maine Central for heavy passenger trains, we carry a back pressure of sixty-five pounds when needed. This, added to the ninety pounds main reservoir pressure, makes a total resistance of 155 pounds to be overcome, but our boiler pressures are 200 pounds on this class of engines and we never had the slightest difficulty in maintaining our brake pressures at any and all times.

"Many prominent air-brake men who have carefully examined this feature are of the opinion that using the pump in this manner is a benefit to it, in that the exhaust being cushioned prevents the pump pounding, and it is a noticeable fact that the pump makes far less noise than with an open exhaust.

"Some say that with this back pressure we take more steam from the boiler to operate the pump. Let us not lose sight of the fact that the valve motion of an air pump on a locomotive is not similar to the valve motion of the main engine cylinders which cut off the steam part way of the stroke and work on expansion the rest of the way, but the valve remains wide open until the stroke is completed; the piston on the completion of the stroke reversing the valve for the opposite motion, and with the steam port wide open from the boiler full stroke we find each exhaust at a very high pressure.

"As to the length of train that is to be heated, it may be said that the amount of steam the pump will furnish will depend largely on the number of stops made and condition of train pipe. In zero weather we might, and undoubtedly would, have to draw some steam from the boiler on trains not making stops, but with our local trains none is required, because the pump furnishes sufficient. In regard to how long it would take to heat a train with the exhaust from the air pump, we do not notice much if any difference from the time required to heat the train when steam is drawn direct from the boiler. In regard to how much pressure is required, I would say that our rules are twenty pounds at the engine for four cars or less, and for each car over four, add four pounds."

The Maine Central Railroad has adopted the device and is rapidly equipping all of its engines with it. It is in in use also on several other New England roads, even on engines equipped with the high-speed brake, and is giving excellent satisfaction. The device is being handled by the Economy Car Heating Co., of Portland, Me., who own the various patents which have been granted thereon.

Draft Rigging Tests on the Atchison, Topeka & Santa Fe.

The draft rigging tests made by the Santa Fe under a drop testing machine, and reported in a paper before the Western Railway Club,* have now been supplemented by road tests and some very interesting and valuable information has been obtained. Two series of trials were made, the first with empty cars having part Dayton and part tandem spring draft rigging, and in the second test the cars were loaded and two locomotives were used at the head end. Briefly these trains were subjected to extraordinary shocks without damage to either the draft riggings or the cars, and further the enginemen were unable to break the trains in two. Probably the tests were even more severe than those which have recently been made with the Westinghouse friction buffer.

The first trials were made on the Chicago Division of the Santa Fe, Jan. 22, under the direction of Mr. Edward Grafstrom, Mechanical Engineer. There were also present Mr. J. Purcell, Master Mechanic; Mr. G. H. Saunders, Trainmaster; Mr. Thomas Layden, Assistant Engineer of Tests, and two car inspectors supplied with extra couplers, knuckles, springs, etc. A consolidation engine, class 17, was used. This has 21 x 28-in. cylinders, 57-in. drivers and carried 180 lbs. steam pressure. The train consisted of 47 empty hopper-bottom coal cars, of 80,000 lbs. capacity and a caboose. The first 12 cars back of the tender were fitted with Dayton draft gear and the others had tandem spring rigging. Observations for speed were taken with a stop watch and a system of signals between the engine and caboose was prepared and

*See *Railroad Gazette*, Nov. 23, 1900.

used during the test. The following is an outline description of the various trials made with empty cars.

Outline of Tests With Empty Cars.

Test No. 1.—Emergency application at 10 miles an hour.
Test No. 2.—Emergency application at 15 miles an hour.
Test No. 3.—Emergency application at 20 miles an hour.
Test No. 4.—Emergency application at 30 miles an hour.
Test No. 5.—Emergency application at 20 miles an hour, with the brakes cut out on the 6 rear cars and the caboose.
Test No. 6.—Emergency application at 20 miles an hour, with the brakes cut out on the 12 rear cars and the caboose.
Test No. 7.—Emergency application at 20 miles an hour, with the brakes cut out on the 18 rear cars and the caboose.
Test No. 8.—Emergency application at 20 miles an hour, with the brakes cut out on the 24 rear cars and the caboose.
Test No. 9.—Brakes cut out on the front 23 cars, engine and tender. The engine was pulling with the throttle wide open and the lever in full gear. At a speed of 10 miles an hour the angle cock on the caboose was thrown wide open, causing a violent emergency application on 24 rear cars and the caboose. The train was brought to a standstill with the engine wide open and stalled.
Test No. 10.—Same as test No. 9, except that the speed was 20 miles an hour.
Test No. 11.—Handbrakes were set hard on the caboose and 10 rear cars. The engine took the slack against them and then started ahead in full forward gear with wide-open throttle. This test was repeated four times.
Test No. 12.—With all brakes cut in and the train moving at 4 miles an hour, the engine was reversed so as to bunch the train; then the lever was dropped down in full forward gear with the throttle wide open, causing the engine to plunge forward. This test was repeated four times.
Test No. 13.—The engineman was then requested to make any other attempt he could think of to break the train in two. He tried in a number of ways, but failed.

The official report of the tests says: "It was found impossible to break the train in two with any of the 13 tests referred to. There was absolutely no damage to any of the draft gears or couplers, but some of the wooden center sills showed splits or cracks from the corners of the key-ways where these were gained into the wood sills. This damage, however, was quite insignificant, did not require any repairs, and in no way affected the strength or safe condition of the cars. If steel center sills were used instead of wood this trifling damage, of course, would not have occurred. Tests Nos. 7, 8, 9 and 10 were particularly hard on the cars. The conductor of the train refused to stay in the caboose.

"It was noticed that there was a good deal of recoil from the springs, and this was to be expected, as, with the play in the couplers and the compression of the springs there was a difference in length of 15 ft. 8 in. as between when the train was stretched and when it was bunched. In tests 9 and 10 the recoil was sufficient to pull the engine back several feet. In spite of all this, it was noticed with surprise that the recoil was always gradual and elastic and free from all jerk, so that this recoil is not likely to cause any damage to the draft gears. From the action of the train it is to be doubted whether the full capacity of all the 188 draft springs was ever fully exhausted."

In view of these results, it was decided to make tests with loaded cars and these were carried out on the Chicago Division, on Jan. 31. Double-head engines were used, one being a consolidation and one a 10-wheeler. The consolidation has 21 x 28-in. cylinders, 57-in. driving wheels and carried 200 lbs. steam pressure. The 10-wheeler has 18 x 24-in. cylinders, 63-in. driving wheels and carried 180 lbs. steam pressure. At the beginning, the train consisted of 42 hopper-bottom coal cars, all loaded with coal. The arrangement of cars, according to the kind of draft gear, is as follows: First ten cars, tandem spring rigging; then two cars with Dayton rigging; 16 cars, tandem spring; five cars, Dayton; one car, tandem spring; two cars, Dayton; five cars, tandem spring, and one car fitted with Dayton rigging, with the caboose at the rear. The gross weight of this train, outside of the locomotives and the caboose, was 2,459 tons, or above the rating of the two engines. The following tests were made with these loaded cars:

Outline of Tests with Loaded Cars.

Test No. 1.—Emergency application at 10 miles an hour. (Following this the train stalled on a 42-ft. grade east of Nixon and had to be doubled over the hill. The slack was taken several times in attempting to start the train before doubling.)

Test No. 2.—Emergency application with all brakes cut in at 20 miles an hour. (Following this the eight front cars were taken off so as to avoid stalling on the grades, as the train was over-loaded, leaving 2,005 tons, gross, in the train without the caboose and engines.)

Test No. 3.—With the brakes cut out on the 6 rear cars and caboose, an emergency application was made at 15 miles an hour.

Test No. 4.—With the brakes cut out on the 12 rear cars and caboose, an emergency application was made at 15 miles an hour.

Test No. 5.—With the handbrakes set hard on the 10 rear cars and caboose, both engines took the slack against them and then started forward in full gear with throttles wide open. Repeated this five times.

Test No. 6.—The angle cock was turned on the ninth car from the rear end and the hose uncoupled between the eighth and ninth cars, thus setting the air-brakes hard on the last eight cars. The engines were then backed up against these and an attempt was made to start the train, with these brakes set, by taking the slack with the full power of both engines. Repeated this five times.

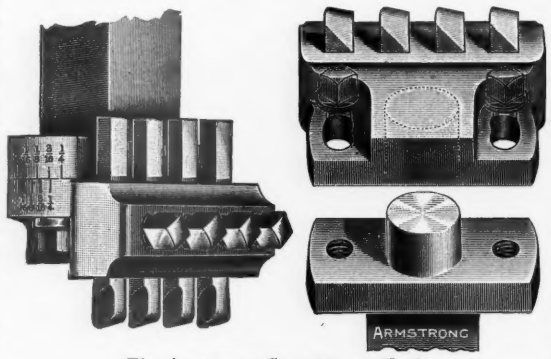
Test No. 7.—The engineers were then requested to make any effort they could to break the train in two. They tried this in several ways, but failed.

Regarding the results of these loaded car tests, the report says: "With the exception of some small cracks in the wooden sills, where the malleable draft arms were gained into the sills, there was absolutely no damage to any of the draft gears, springs, or couplers. The cars, after the tests, were carefully inspected in daytime by regular car inspectors who searched them thoroughly for any damage. Six of the cars used in this second test had been previously used in the first test. Test No. 6 of the second series was exceptionally severe on the cars.

"It is to be noted that the tests with the empty cars of Jan. 23 were nearly a duplication of the Westinghouse tests made at Walls,† as near as our local conditions would allow of their being duplicated with an engine of about 20 per cent. more tractive power than the Pennsylvania R. R. engine used at Walls. The test of Jan. 31 is comparable with the tests made of the Westinghouse friction gear at Wilmerding, because the aggregate power of the two engines was nearly that of the Pittsburgh Union R. R. engine used at Wilmerding, while the weight of the train used in our second tests was in excess of the weight of the train used at Wilmerding. In referring to these Wilmerding tests, we are speaking from the published reports in the papers."

A New Gang Planer Tool.

The Armstrong Bros. Tool Co., Chicago, which has brought out a variety of applications of the Armstrong tool holder for lathe and other machine work, has recently put on the market a gang planer tool which is especially adapted for surfacing large castings. On such work it is claimed the new tool will effect a saving of from 50 to 75 per cent. of the time required to do the same job with a single point tool. This new tool is shown by the accompanying engravings. The head of the tool is solidly secured to the shank, on which it swivels to a limited extent because of a deep and closely fitted tongue and socket. When set the position of the head is fixed by two steel collar screws, the head being



The Armstrong Gang Planer Tool.

graduated so that the tool can be quickly and accurately set to suit the feed. Both the shank and the head are steel drop forgings, and all parts are hardened. The set screws are tool steel tempered on the point.

With this tool the work may be distributed between the several cutters, each cutter taking a light cut. The result is that the chips are light, making it possible to use a greater depth of cut and a greater feed than with single point tools, with less tendency to break out at the end of the cut. The cutters are made from stock sizes and shapes of self-hardening steel. To facilitate grinding the cutters to correct contours, gages are furnished.

Specifications for Rails.

At the Richmond meeting of the Institute of Mining Engineers the following contribution to the discussion of the proposed specifications for steel rails was made by Mr. R. Trimble, Principal Assistant Engineer Pennsylvania Lines West of Pittsburgh. The specifications were published in the *Railroad Gazette* some months ago, and are not reprinted in this issue, as the points of Mr. Trimble's remarks are perfectly obvious.

There are only two points, at the present time, in the specification that the writer is prepared to discuss:

First: Paragraph 6, relating to the section reads: "Unless otherwise specified the section of rail shall be the American standard, recommended by the American Society of Civil Engineers." The writer would eliminate the words "Unless otherwise specified," making it read: "The section of rail shall be the American Standard recommended by the American Society of Civil Engineers, etc." Recent information indicates wide use of the American Society sections, and so far as we are able to judge at the present time, these sections are giving good service, and are satisfactory. The writer believes that in preparing a standard specification we should also adhere, so far as possible, to one standard section. We should make the specification as we want it, and endeavor to convert as many as possible to what we believe to be the best practice.

Second: Paragraph 8, referring to the length, states: "The standard length of rail shall be 30 ft." The writer is opposed to this. Most of us can remember when 28 ft. was the standard length of a rail, and these standard lengths of 28 ft., and 30 ft. which came later, were fixed by the length of the cars adapted for transporting the rails. The lengths of the cars have increased in recent years, so that we now have cars from 33 ft. to 38 ft., inside dimensions. The writer thinks that the shortest car being built at the present time will take care of a rail 33 ft. long, and therefore the minimum standard length should not be less than 33 ft. A number of roads are using this length of rail, and it has the very great advantage of doing away with 10 per cent. of the joints, the joint being one of the weak places in our present track.

†See *Railroad Gazette*, Oct. 12, 1900, page 667.

Roundhouse Management.*

When an engine arrives in the yard the essential thing is to get it to the roundhouse at the earliest possible moment. The roundhouse foreman should instruct the hostler's assistant to put in the coal boards, put the clinker hook in place, get the coal pick and shovel out of the pit of the tank and put them where they will not be covered up when the coal is dumped into the tank. The hostler should look at the coal ticket and find out the amount of coal required; if the ticket calls for seven tons of coal, he should stop the engine under the seven-ton pocket. The coal chute hostler and his helper now take the engine, dump the coal into the tank, and the engine now starts for the water tank and sandhouse. On the way to the water tank, the hostler's assistant gets the oil cans out of the oil box, sets them upon the deck and has them ready to hand to the oilhouse man as soon as they arrive at the oilhouse. While taking water and sand, the oilhouse man issues the proper amount of oil and brings the cans to the engine. In the meantime the roundhouse foreman has got the work report on the engine. We will say, for instance, that he has one or more driving boxes to pack, and a piston packing to look at; he should have his men at the ash pit, ready to do this work as soon as the engine arrives at the pit; he should also have his engine inspector there, ready to inspect the engine, and, should he get through with his part of the work first, he should then take hold and help the man that is packing the driving boxes. If these men all work together they will all finish at about the same time; the engine can then be run on the table, turned, and is ready to go back again—it should not take over 30 minutes to do this amount of work, that is to say, 30 minutes from the time the hostler gets this engine in the yard it should be ready to depart again. If the engine is run over the table and put in the roundhouse to do this work, it will take at least 14 minutes additional time; if the coal boards are not put in their place while the engine is coming from the yard to the coal chute, this will take five minutes more, which makes 19 minutes. Therefore, we have saved 19 minutes on this one engine.

Let us take an engine that is a "wash-out." We will say that it arrives on the ash pit with 130 lbs. of steam. While the fire is being knocked, the globe valve should be opened in the dome in order to reduce the boiler pressure as soon as possible. The engine should be allowed to blow off while it is being put in the roundhouse, the boiler washer should have his hose coupled to the hydrant and be ready to connect his hose to the feed pipe as soon as it stops. If by this time the boiler pressure has not been reduced sufficiently, both relief valves should be taken out of the steam chest, the engine thoroughly blocked and the throttle opened as much as is safe; the injector throttle should be closed and the water put in through the check; if the water is let in through the injector throttle, the contraction is too quick, which is hard on both stay-bolts and flues. When the steam has been reduced to about 30 lbs. the blow off cock can be opened, but the hydrant ought not to be shut off. Let the cold water run as long as possible. The boiler washer can start to loosening his plugs before the steam pressure is off. I do not mean that he shall take the plugs out, but get them started so he can take them out quickly when the proper time arrives. While the engine is cooling and the boiler washer is loosening his plugs, have the fire lighter get his wood and material ready to fire up. When the boiler washer and his assistant have all the plugs loose they take them out of one side and commence washing on the side that they have taken the plugs out. The fire lighter has his work done now, he can take the plugs out of the other side. As soon as the boiler washer has shot the legs and crown sheet, the fire lighter can commence putting the plugs in again; he should not be allowed to tighten them up, but screw them in as far as he can with his fingers. By watching these points closely a fair job of boiler washing can be done in two hours and 30 minutes.

In addition to this the fire lighter should have his hose connected to the blower, should have his wood and waste in the fire-box and ready to light as soon as the boiler is filled. It should take at least one hour and 30 minutes to get up steam when the boiler is filled with cold water. I know nothing that is more injurious than crowding it in getting up steam after a wash-out. It is true that you can take a boiler full of cold water after a wash-out and get up steam in 35 or 40 minutes. I have done this myself on certain occasions, but I never brag to the Master Mechanic about it; in cases of this kind, when a boiler is crowded, you will find spots that are cold after

*Extracts from a paper by Mr. A. H. Powell, M. M., D. & R. G. Railroad; November, 1900, meeting of the Rocky Mountain Railway Club.

the engine has 30 lbs. of steam, and in a very short time the boiler will show the effects of this mode of handling, in the way of broken stay-bolts and cracked flue sheets. I believe that if all roundhouses could be equipped with a hot water plant it would be a paying investment.

Good engine inspection is very essential, and should not be trusted to any except a thoroughly competent man. An engine inspector should be allowed time to do this work thoroughly. He should carry one open end wrench ⅞ in. on one end, and ¾ in. on the other. This wrench should be about 18 in. long, and in addition to this he should have a hammer and a flat chisel; he should carry cotter pins in his pocket; should he find a loose nut, he should not be allowed to come out of a pit, and lose 10 minutes hunting a wrench to tighten it. Neither should he be allowed, when he finds a missing cotter pin or split key, to spend 10 or 15 minutes hunting up the foreman to get a requisition to draw these things, and spend another additional five or 10 minutes going after them, but should at all times carry them with him. When he finds a defective part he should not jump out of the pit and run after the foreman to tell him of it, but should finish his inspection of that one engine, then if he has found anything of note, he should report it in person to the roundhouse foreman. In addition to this, he should report the work on the work book. He should also carry an inspection book. In this book he should enter the numbers of all the engines inspected during the day; the foreman should check this off of the inspector's book and leave a copy of the day's inspection for the information of the night man. The inspector should have some mark by which the foreman can tell when he has inspected an engine.

We will now say a few words about the handling of the "work book." In most roundhouses the roundhouse machinist gets his work off of the work book himself. A great many times, before he gets back to the engine he forgets a part of the work report he has read from the book. He must then return and read it again, or perhaps some other workman has been to the book before him and has had his dirty hands upon the pages of the book, the writing is nearly obliterated, and it takes him three or four minutes to make out intelligently the work report; thus a great deal of valuable time is wasted. Distributing the work on slips is a good way to overcome this evil. The slip system gives the foreman a chance to sort his work. When the machinist and helper have their work done, have them put their initials or name on the back of the work slip. File your slips after they have been turned in at the end of each day, and hold each slip an average of six days, at the expiration of which time you can throw them in the waste basket. This gives ample time to determine the quality of each job.

Foreign Railroad Notes.

The Sultan has appointed as Chief Engineer of the Damascus & Mecca Railroad, which is, as it were, a religious enterprise, Heinrich Meissener, a German engineer, who for 20 years past has been employed on Turkish railroads both in Europe and Asia.

The Prussian State Railroads contract for their coal far ahead. In December a contract was made with a syndicate of coal miners of Rhenish Westphalia (one of the two great German coal fields) for furnishing 3,000,000 kilometric tons within the year beginning with next July, as well as for the current year, at the price of 11.10 marks, equaling $2.64 per ton, or $2.40 per ton of 2,000 lbs., at the pit's mouth. This price is the highest ever known until within a year or so. The extraordinary demand in Germany for coal has apparently passed, the demand and prices for iron, etc., having fallen off materially.

The Belgian State Railroads have recently given out contracts for a very large number of cars. To three German works were awarded contracts for two lots of second-class passenger cars and two lots of freight cars. French and Italian works are to build a number of third-class cars, and Belgian works the rest.

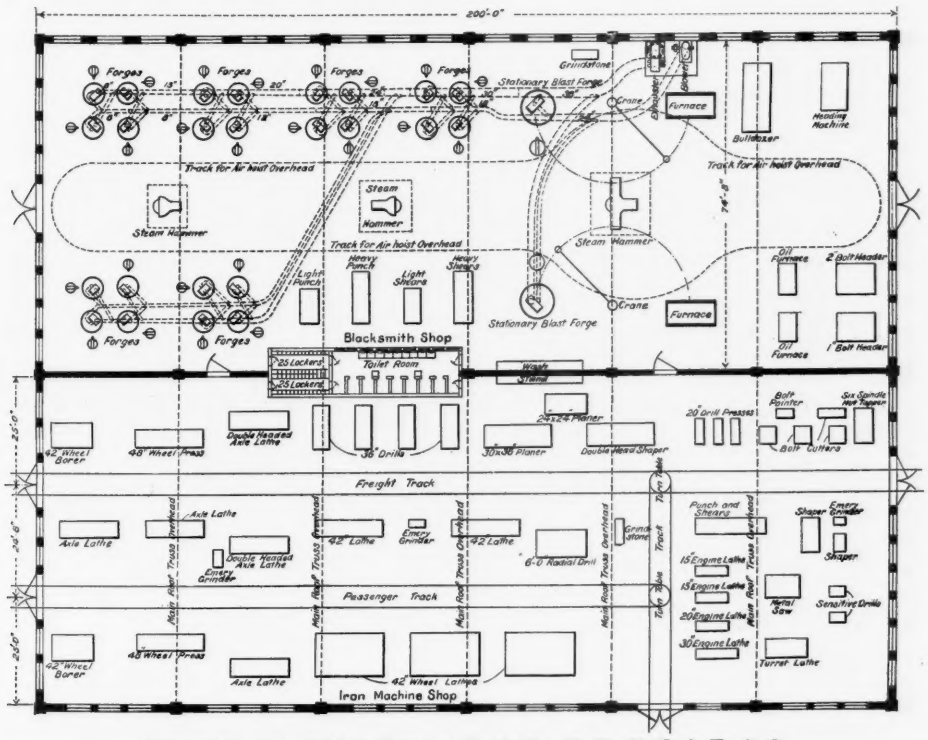
Chicago Track Elevation.

At a meeting of the Chicago City Council, Feb. 12, the ordinance to elevate the tracks of the Pittsburgh, Cincinnati, Chicago & St. Louis, the Chicago & Northwestern and the Chicago, Milwaukee & St. Paul in Kinzie street with some objectionable clauses stricken out was passed. This ordinance was described in our last issue, and in its present form will doubtless be approved by the railroads. The Pittsburgh, Cincinnati, Chicago & St. Louis elevation will begin at Fulton street, and the Northwestern at Kedzie avenue, both extending east to Ada street. The Chicago, Milwaukee & St. Paul elevation will be from Grand avenue to a point about 200 ft. west of Western avenue.

Another ordinance was passed covering the elevation of the tracks of the Lake Shore & Michigan Southern and the Chicago, Rock Island & Pacific from Twelfth street north to the terminal station. This work will be done in connection with the building of a large new passenger station on Van Buren street, the tracks coming in on a level with the second floor.

Readville Car Shops—New York, New Haven & Hartford R. R.

In our last issue appeared a general plan and description of the car shops building at Readville, Mass., by the New York, New Haven & Hartford. With the aid of Mr. W. P. Appleyard we are now able to show the arrangement of tools and machinery of the blacksmith and machine shops. The tools for these shops have been definitely selected and their location fixed.



Blacksmith and Machine Shops at Readville—N. Y., N. H. & H. R. R.

The east front of the blacksmith shop will have the main entrance, as it faces the storehouse from which the major portion of the material used will be drawn. In this shop will be a broad central aisle in which the three steam hammers will be placed, the largest one being farthest from the door. The hammer nearest the door is 1,000 lbs., and the next one 1,500 lbs., while the largest has a weight of head of 4,000 lbs. The first two are for light work only, and will be served by the open forges arranged along each side. These forges will be of the Buffalo type, and set in groups of four, 24 in all. The blast will be furnished by a blower near the west end of the shop, and the products of combustion will be drawn off by a fan set near by. Both the blast and exhaust passages are to be carried beneath the floor, as shown by the dotted lines. This leaves a clear space above the fires for handling heavy material by the overhead track. This track will be continuous, and will be supplied with a sufficient number of air hoists to do such work as may be needed.

The shop will be piped with compressed air, and the hoists will be provided with attachments by which connection can be made at any point where it is desired to operate them. The method of procedure will be to connect the hoist with the compressed air pipes, and raise the load. The air contained in the hoisting cylinder will then be locked in by a valve, the connection broken and the load and hoist moved by hand to any desired point. A fresh connection can there be made with the compressed air supply, or the load may be lowered by merely allowing the air to escape. The hoists will be simple cylinders carried by a lorrey running on the overhead track.

The large steam hammer will be served by two cranes so arranged that they can remove material either from the stationary blast forges or the large furnaces.

The west end of the shop will be occupied by the bolt heading and forging machinery. This will consist of a heading and forging machine, a bull-dozer, a 1-in. bolt header, a 2-in. bolt header and two oil furnaces, one for each of the bolt headers.

There will be two small doors giving communication with the machine shop through which material can be carried, and outside the eastern door, running across the face of the building, is the track by which forgings can be taken to the erecting shop. Between the blacksmith and machine shop are the toilet room and lockers for the accommodation of the men of both shops. Opposite the toilet room are the punches and shears, which thus conveniently serve all of the forges.

The motive power for the shop, with the exception of the steam hammers and air hoists, will be electricity. The bull-dozer and heading machine in the southwest corner will be driven by a single motor from an overhead shaft. The two bolt-headers will be driven in the same manner by another motor. The punches and shears will be driven by one motor with straight pulley connections eo each. Among the air hoists there will be one of 1-ton capacity.

The engraving shows the location of the tools in the machine shop. Two tracks will enter this building, one running through it from end to end and the other extending down to a cross track that leads across the open space on the north side of the machine shop and into the truck shop. Here, too, the material is to be brought in at the east end. Close to the doors, and in the corners where there will be ample storage capacity for wheels against the walls, will be the two wheel borers. Next to them, on either side, are to be the hydraulic wheel presses. Just beyond these presses, as well as between the tracks, will be five double-headed axle lathes, with an emery wheel for grinding tools set conveniently. This groups all of the wheel and axle machinery for new work together. Beyond this on one side there are to be three 42-in. wheel lathes, and opposite them, between the tracks, two 42-in. lathes for turning journals without removing the wheels, with another emery grinder between them. This group embraces the machinery for repairs on wheels and axles. Opposite this group will be four 36-in. drill presses with automatic feed and back gearing. Two planers and a shaper will stand just beyond these drills, and near them, between the tracks, a grindstone and radial drill. The western end of the shop will be occupied by the small tools.

As in the blacksmith shop the power will be supplied by electric motors, of which there will be five. There will be one to drive the small tools between the track and the wall in the southwest corner of the shop, and another to drive those opposite in the angle of the longitudinal and cross tracks. Both of these motors will be placed overhead and drive a shaft from which belts will be led to the several machines.

The rest of the machinery will be driven by three lines of shafting running lengthwise of the building, extending from the cross track to the east front and on the outside of and between the tracks. Each shaft will be driven by a separate motor, and will in turn drive, by belting, the machinery grouped in the space beneath.

In the power house will be three batteries of water tube boilers, with two in each battery of 250 h.p. each. There will be three engines to drive the direct-connected dynamos by which current will be generated for all the shops. No power will be transmitted from the engine house by belting.

In the truck shop will be two electric traveling cranes of 25,000 lbs. capacity; one of which will be placed over each track. There will be no standing machinery in this shop, but it will be piped with compressed air and supplied with the necessary hand tools.

In the pipe shop will be the usual complement of pipe and tinsmith's tools. The cabinet shop will be without machinery, and will be filled with benches, the only exception being that at one end there will be two heavy presses for making headlinings. Here all of the office furniture in use on the whole system will be made.

The mill will be filled with heavy wood-working machinery for car work of all descriptions. The final decision as to this machinery has not been made, nor has the disposition of that already chosen been settled. It would, therefore, be premature to publish a plan of the internal arrangements of this shop at present. It may be stated, however, that the shop will be driven by several electric motors each coupled to a shaft running across the building close to the roof trusses. From these shafts belts will be led down to the machines beneath.

The conditions governing the construction of the freight shops and paint shop, as well as a description of the roof and wall constructions of the several buildings, was fully dealt with in the previous article.

As it is not expected that the shops will be ready for occupation much before a year from this coming spring it naturally follows that many of the smaller details of the arrangements of the shops and yards have not yet been fully settled. In fact, it would be very strange if there were not many things, regarding which no decision will be made until the shops have been put into actual operation, and experience has shown just what is needed to secure the highest efficiency.

RAILROAD GAZETTE

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EDITORIAL ANNOUNCEMENTS.

CONTRIBUTIONS—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussion of subjects pertaining to ALL DEPARTMENTS *of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.*

ADVERTISEMENTS—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. *We give in our editorial columns* OUR OWN *opinions, and these only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advetising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.*

Railroad gross earnings for January show an increase over the corresponding period of 1900 of $4,275,000, or 7.94 per cent. These are the *Chronicle's* figures compiled from returns by 107 roads aggregating 101,882 miles against 99,069 by the same roads a year earlier. These gains follow improvements of the three preceding years of $6,671,000, or 15.14 per cent., in 1900; $2,942,000 in 1899, and $6,044,000 in 1898. The Baltimore & Ohio leads in the increases with $445,000. The Missouri Pacific gained $378,000, the Missouri, Kansas & Texas $342,000, the Northern Pacific, $320,000 and the Southern Railway $254,000. Only six of the companies reported losses of over $30,000, led by the Canadian Pacific, $101,000, and the Mexican Central $70,000. All of the groups of roads showed gains, the heaviest being the Southwestern (nine roads) $1,439,000 and the Southern group (11 roads) $932,000. In general the conditions were favorable, though at the South the cotton movement fell below that of a year ago which was smaller than the movements of the two preceding years. The receipts at Southern outports were 714,782 bales this year against 722,526 bales last year; 826,870 in 1899, and 1,030,393 bales in 1898. The overland movements were slightly better, being 222,256 bales this year, in contrast with 203,647 bales in 1900, but 325,563 bales in 1899. The movement of grain in the West was heavier, though the influence of the failure in spring wheat was still felt in smaller receipts at Duluth and Minneapolis. At the western primary markets the receipts of wheat, corn, oats, barley and rye together for the five weeks ended February 2, 1901, were 63½ million bushels against 52½ million bushels the year before. There were large gains in receipts at St. Louis, Kansas City and Chicago. The live stock movement showed little improvement in the latter city. The receipts of hogs this year were 876,610 against 880,896 in 1900, and 846,279 in 1899. Live stock receipts, as a whole, were 25,877 carloads in 1901, against 25,472 in 1900.

The struggle which has been going on for some time with regard to certain phases of the tariff as between the United States and Russia has suddenly culminated in the action of the Russian Government in imposing increased duties on articles imported from the United States. Our readers probably know that our Secretary of the Treasury felt bound under the law to collect a duty on beet root sugar imported from Russia, this because he construed the Russian laws and practice as paying a bounty on sugar exported from that country. The Russian Minister of Finance has taken the natural step of laying a duty which will add a heavy percentage to the tax now imposed upon machinery and other material which we send to Russia. The prospect of this action has for several weeks caused a good deal of uneasiness among our exporting manufacturers and has brought about strong efforts to prevent the imposition of the duty on Russian sugar. No doubt, it will be a serious blow to our trade with Russia and we must hope that an adjustment will speedily be reached which will lift this tax. Our exports to European Russia in 1900 amounted to $8,500,000 and in 1897 to $6,125,000—a very substantial increase. But our exports to Asiatic Russia grew from $454,000 in 1897 to $2,787,000 in 1900, or six times. In the same period our imports from Russia increased from $4,000,000 to $7,997,000. In all of this trade sugar imported is but a trifle in actual value, while our manufactured products make a very large part of the exports. And yet we have no doubt that the Secretary of the Treasury felt that he was simply carrying out the laws of the United States as he is bound to do.

Draft Gear.

Last October we published an account of some severe service tests, on the Pennsylvania Railroad, near Wilmerding, with a train of empty coke cars fitted with Westinghouse friction draft gear. Since then these trials have been repeated under even more severe conditions with the uniform result that neither the cars nor the draft rigging were injured. At the time of the first Westinghouse tests we said in effect that while the results were not unexpected, we having watched the development of this apparatus for years, nevertheless they were astonishing. In this issue is an account of similar service tests of spring draft rigging, made on the Santa Fe, where spring gears also withstood extraordinary shocks, and the results of these later tests are not only equally astonishing, but to us they are unexpected. Probably no one familiar with spring draft gear as usually applied could have anticipated the outcome, and surely those directing the trials did not. However that may be, the important point is that these double spring riggings are a great improvement over the ordinary arrangement and have stood without breakage of cars or draft gears as severe service tests as have been given to friction gears. And the shocks in these tests are greatly in excess of anything likely to arise in ordinary service. This sort of information is just what is needed now.

In the tests of the Westinghouse apparatus, published October 12 of last year, there were 47 empty cars hauled by a heavy mogul engine of the Pennsylvania Railroad. Emergency stops were made from 20 and 30 miles an hour and then these trials were repeated, cutting out brakes on the rear cars until 24 cars were cut out. The absence of blows or real shocks was noted particularly. Jerk tests were made by cutting out the brakes on the first 24 cars; then without notice to the engineman, the brakes on the rear cars were fully applied by opening an angle cock at the rear when running about 20 miles an hour. Further, jerk tests were made by setting hand brakes on the rear cars and allowing the engineman to take the slack and start ahead with the full power of the engine. Later these jerk tests were repeated with one of the heavy locomotives of the Pittsburgh Union Railroad which has a tractive power of about 53,000 lbs. and about 208,000 lbs. on the drivers. No damage resulted to the cars or the friction draft gear and those who have witnessed these exhibitions have been impressed with the smoothness of working of this apparatus and its great capacity.

Intentionally the Santa Fe tests were made comparable with these. The conditions are clearly set out on another page and need not be repeated here. They were certainly severe enough to suit anyone. But one point of difference, not brought out, may be mentioned for what it is worth. In the Westinghouse tests the cars had been in practically continuous service for two years while the Santa Fe tests were made with new cars. However, it is probable that the results would not have been different, had the spring gears been in good repair, even after a somewhat longer service.

Not much is said in the report about the nature of the shocks in the Santa Fe tests. Although nothing broke, it is inferred that the shocks were pretty severe from the fact that the conductor refused to stay in the caboose during some of the trials; in the Westinghouse tests the absence of shocks was a matter of comment. This is a point that we imagine would be apparent if trains with spring gears and trains with friction gears were tested at the same time and place. And it is hoped that the M. C. B. Committee on this subject can make experiments to show the facts.

The Santa Fe tests show conclusively that it is possible to have a spring draft gear of comparatively small spring capacity, so the recoil is not likely to cause damage, which in connection with dead blocks will meet the extreme requirements of service. It is by no means certain that this is the best way to do it, but the tests show that it is one way. In bulling, the blow is largely taken by the dead blocks, and under pulling forces the followers come up solid against the stops before the springs fully close. This saves the springs but presents rigid stops for heavy bulling and pulling forces. In the gears tested, it is plain that the attachments are strong enough to stand up under these heavy blows and such spring rigging costs about $30 a car less than a friction gear; it has fewer parts and is simpler in construction. On the other hand, the friction gear has over three times the capacity of these spring gears and greatly modifies the shocks; things which a number of people think are worth the greater cost in increasing the life of the car and decreasing repairs. Others take an opposite view.

We anticipate that these tests will increase the interest in draft gear and will act as an incentive for more work along the same lines which will be of the greatest benefit. They certainly give the spring draft gear a new lease on life.

Exports of Iron and Steel in 1900.

In the year ended December 31, 1900, the total exports of iron and steel from the United States (not including ore) amounted to $129,633,000. The increase over 1899 was $24,000,000 and over 1898 $47,000,000, or 56 per cent. in the two years. The total exports of domestic merchandise amounted to $1,453,000,000 and the increase in the two years was 18 per cent. That is, the iron and steel exports grew more than three times as fast in those two years as all exports and in 1900 amounted to nearly 9 per cent. of the total.

Obviously, the iron and steel item must be a good deal less than the amount of several other great items. For instance, last year we exported breadstuffs to the value of $250,786,000; cotton and manufactures thereof, $336,649,000; provisions, $186,569,000. On the other hand, the iron and steel exports were considerably greater than several other important items. In the last year we exported mineral oil to the value of $64,307,000; leather, $27,169,000; tobacco, crude and manufactured, $32,684,000; wood and its manufactures, $52,527,000.

But presumably exports of railroad material and machinery are of most interest to the majority of our readers. We find that in 1900 our exports of steel rails amounted to $19,895,000 and the increase over 1898 was 87 per cent. The average value per ton in 1900 was $30.00 and in 1898 $19.80. Thus while the value of rails exported increased 87 per cent. the tons increased only 21 per cent. in the two years. The heaviest export of rails was to British North America, namely, to the value of $3,787,000. Next in order of value is Asia and Oceanica other than Japan and Hawaii, namely, $1,655,000, while Japan took rails to the value of $1,568,000. Mexico and Europe each took over $1,000,000 worth.

Our exports of locomotives in 1900 amounted in value to $4,493,527 and in number to 436 or $10,250 apiece. There was a falling off as compared with 1898 and 1899; that is, in 1898 the number of locomotives exported was 573 of an average value of $9,000 each or a total of $5,190,782, and in 1899 the number exported was 484, average price $9,800, total value $4,767,850. In stationary engines the trade increased from $353,000 in 1898 to $874,000 in 1900 and boilers and parts of engines also increased materially, aggregating last year $1,855,000. Our exports of car wheels continue to be of little value, amounting in 1900 to only $172,155, the average value having been $7.28. The increase over 1898 was only $48,000. The returns do not indicate except by the average value how many of these car wheels were cast iron. The total value of castings exported (not otherwise specified) amounted to nearly $1,500,000, the value having about doubled in two years.

Our exports of pig iron aggregated $4,651,000 at the average price of about $16 per ton. In 1898 the total was $2,547,000 and the average price $10.20 per ton.

The other great items of export of iron and steel were, wire 4½ million dollars, structural steel 3½ millions, steel sheets and plates 1⅔ millions, builders' hardware, saws and tools 9¾ millions, bars and rods 3½ millions, billets, ingots and blooms 3 millions.

We exported instruments and apparatus for scientific purposes, including telegraph, telephone and other electrical apparatus, to the value of $6,789,000 and electrical machinery to the value of $5,286,000. Our exports of metal working machines amounted to $6,211,000 while printing presses, pumps and the like amounted to $4,000,000.

Fig. I.—General Plan of the South End of Conneaut Harbor Yard.

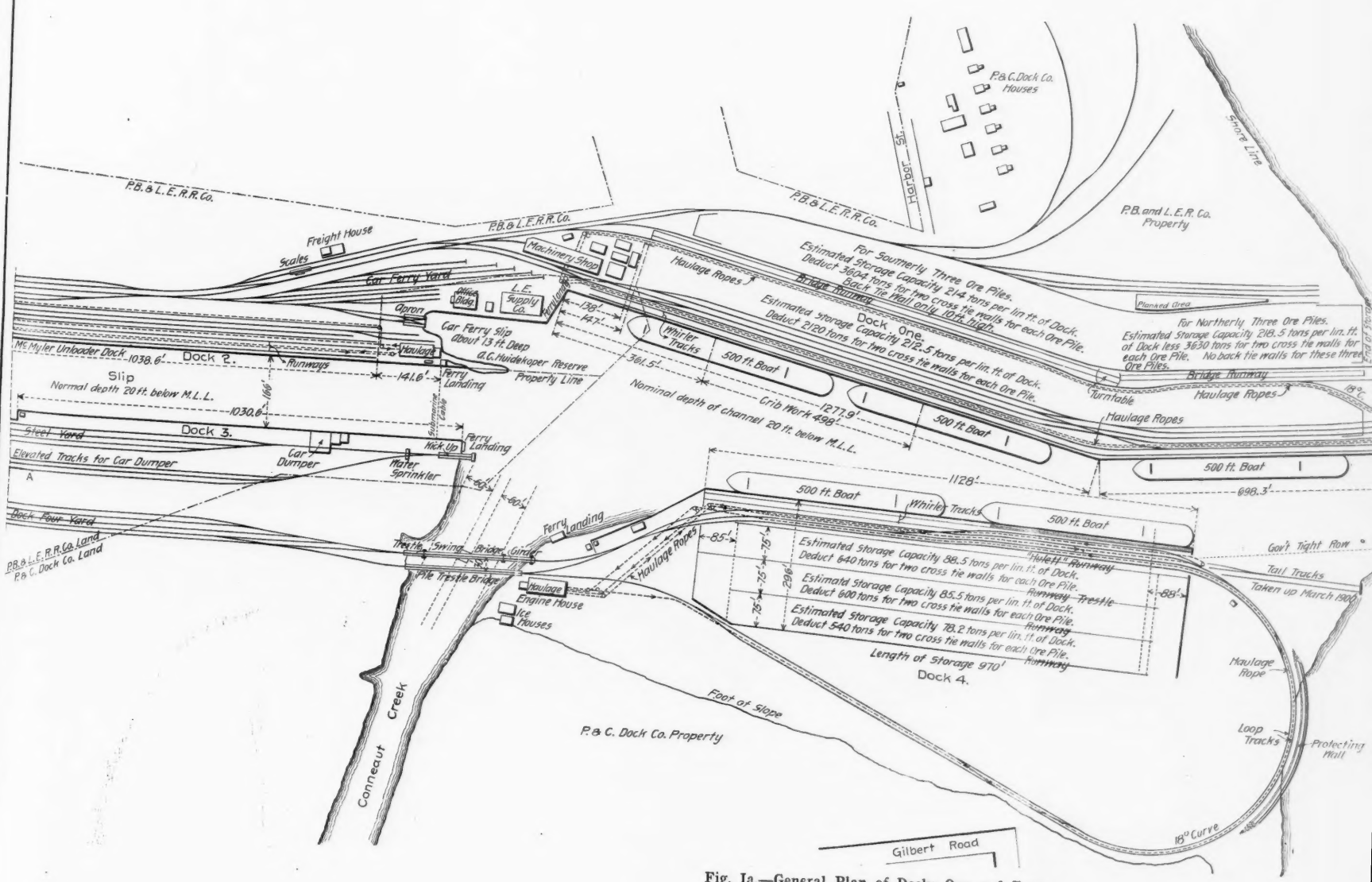


Fig. Ia.—General Plan of Docks One and Four.

—General Plan of the South End of Conneaut Harbor Yard.

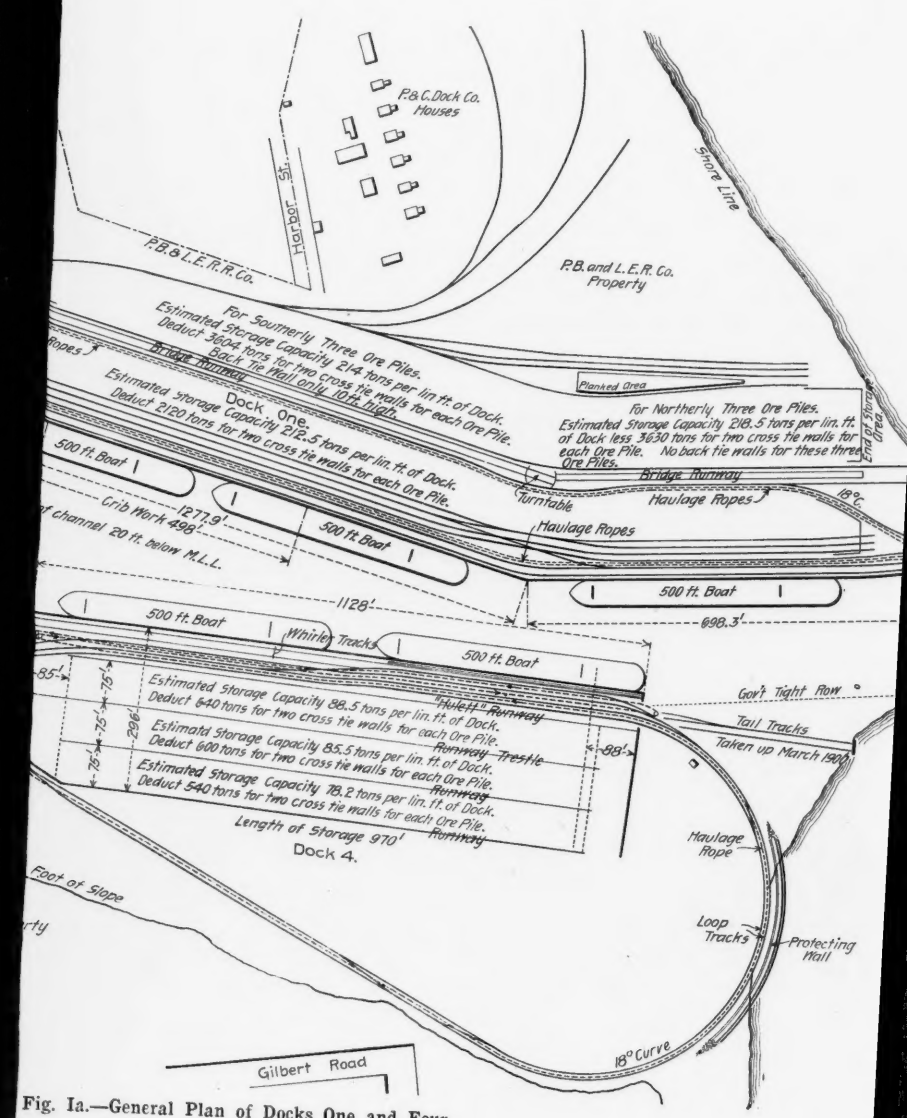
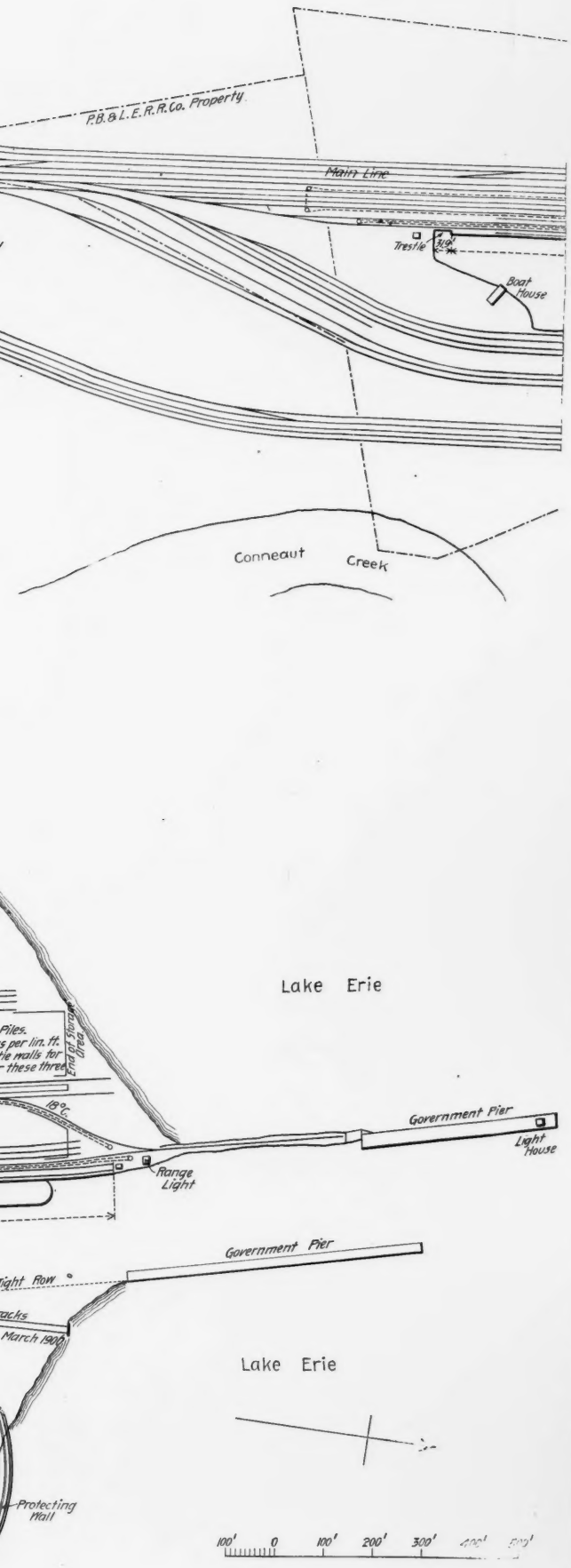


Fig. Ia.—General Plan of Docks One and Four.



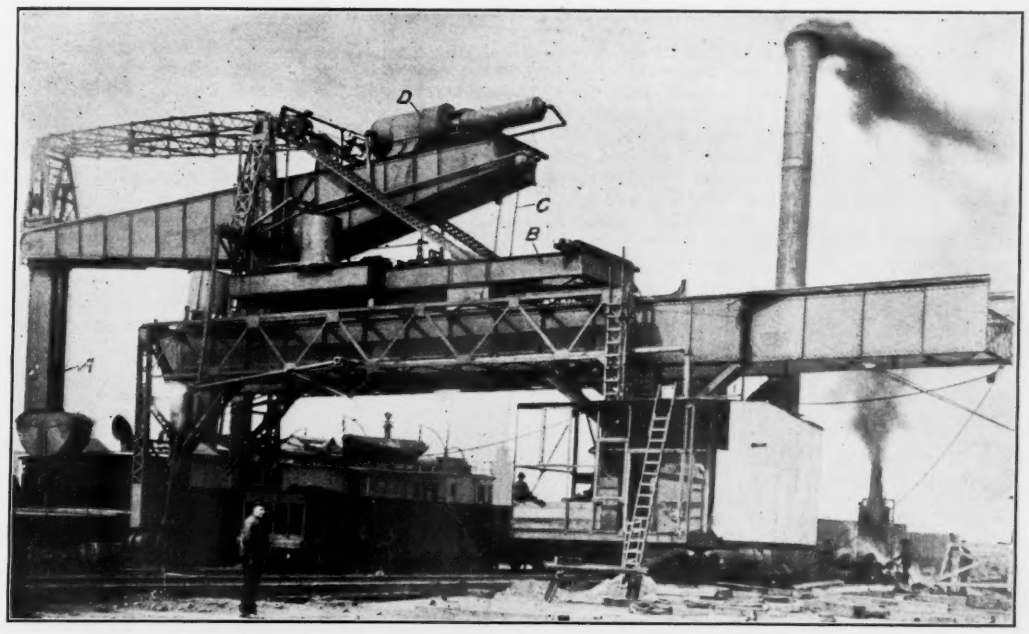


Fig. 7.—The Hulett Unloading Machine with Bucket Raised.

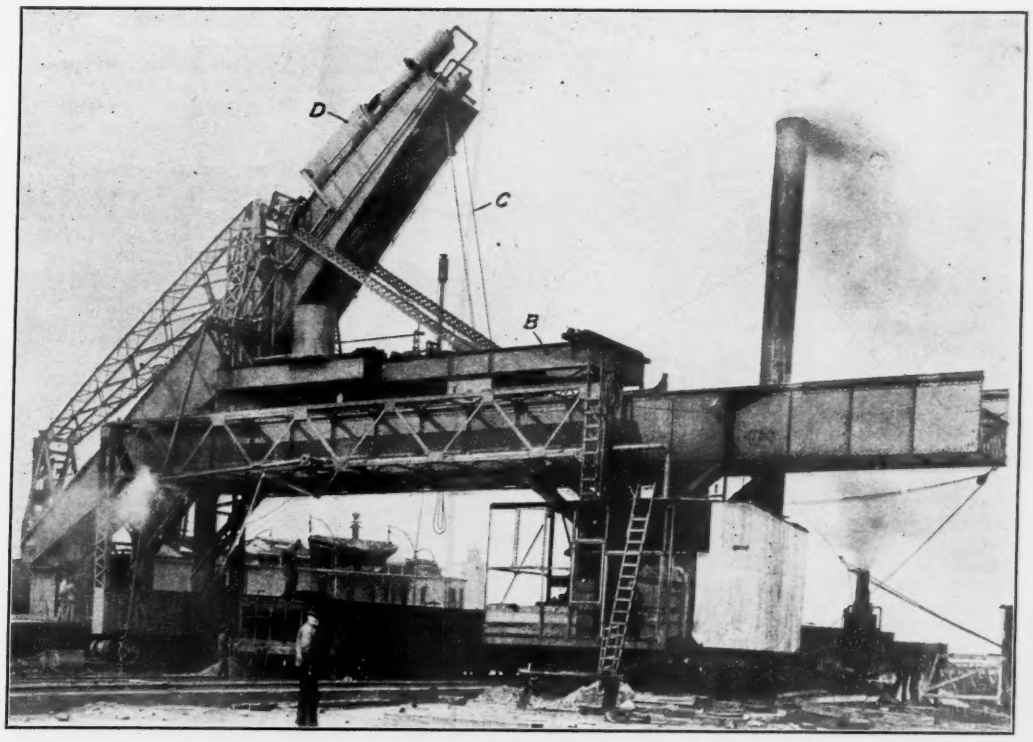


Fig. 8.—The Hulett Unloading Machine with Bucket Lowered.

Fig. 3.—Ore Piles at Conneaut Harbor in the Fall.

The Connecticut Trolleys.

The Connecticut General Assembly, in 1895, several years after the trolley companies of the State had begun to operate and at a time when 22 companies were in operation, passed a law requiring returns to the Railroad Commission of the State. The law was not passed until the last quarter of the year for which returns were exacted by the statute; the companies had not so kept their books as to supply figures for the official forms; and the "bond and bonus" era of building on bonds and distributing stock, of paying contractors with shares or bonds, or both, of financing both old and new roads with fractional payments of cash by the promoters, of acquiring old horse railroads and "loading" them with trolley obligations, had already begun. Thus, largely as the result of legislative carelessness, the Commission returns had to begin with much guesswork and with construction accounts evidently inflated. Two years later the Commissioners complain that "the cost of construction and equipment cannot be given separately" and so late as 1898 one finds, for example, in a Connecticut city two roads with approximately equal mileage and equipment differing by a ratio of more than two to one in the returned cost of construction and equipment. Original errors, some of them of large magnitude, thus, perhaps necessarily, persist in the Commission returns from year to year and will continue to do so. Though why, for an instance, in the case of one very prosperous company the "stock issued for cash" should fall to $500,000 in 1900 from $900,000 in 1898 along with a large increase of total capital stock is more difficult to understand on any theory of supplying clear information to the public. The accuracy of the returns has been further impaired by the merging of electric lighting figures with the business of several of the trolley companies.

But, even with allowance for such obscure factors, the returns of the Connecticut trolleys as set forth in the State Commission report published a few days ago are suggestive. Taking the 31 operated roads in the state, of the $12,143,448 of stock outstanding only $4,529,940, or a little more than 37 per cent. has been issued as cash. The difference of 63 per cent. is returned in many forms—for "construction," for "acquired roads," for "equipment," "to contractors," and for other purposes, obviously not all representing fictitious values, but leaving large scope for fancy in determining the ratio between stock issued and value received. Out of the 31 operated roads 12 appear in the returns with stock not fully paid in as cash; and it is significant that, in general, the trolley roads of the "cross-country type" and newly built as separate roads have been more conservatively financed than those of the larger cities. The natural explanation is that the cross-country lines have required an equity value in stock so as to be able to place bonds as contrasted with the old and prosperous city lines on which handsome and increasing net earnings have stimulated stock expansion. In connection with this branch of the subject may be noted the application of the leading "syndicate" corporation in the state for power to increase its $1,000,000 of stock to $15,000,000. But its properties owned or controlled include many lighting plants as well as trolleys.

The bonding phase of Connecticut trolley financiering as brought out in the Commission report has also its features of interest. The total of bonds outstanding on the 31 roads is $10,592,800, or somewhat more than five-sixths of the sum which represents outstanding stock, and somewhat more than double the $4,529,940 of stock returned as paid in as cash. The extent to which bonds have figured in the construction of Connecticut trolleys is obvious on the face of the figures. The cash realized on the $10,592,800 bonds issued—practically all of them 5 per cents, and many of them long-time bonds—was $7,584,864, which, on the face of the return, would show that the bonds were marketed at about 72. But here, again, allowance must be made for bonds issued directly to contractors as payment for construction—an allowance which would diminish the divisor and increase the quotient or market price. With bonding so high in proportion to cash capital it is a remarkable fact attesting strikingly the prosperity of the Connecticut trolleys that, as now recalled, only in one case—and that where capital had been fully paid in as cash—has there been a default of interest by an operating Connecticut trolley company followed by a receivership while the bonds of almost every trolley property sell well above par and some of them on as low a basis of interest return as the senior bonds of good dividend paying steam roads.

From the Commission report can also be derived figures showing the extent of trolley consolidation which, in Connecticut, as elsewhere, has followed the analogy of steam lines. Eight years ago at the opening of the year 1893 there were 147 miles of street railway in the state. There are now, by the State Commission return, 499.8 miles. Of these 379 miles, or about 76 per cent., are owned or controlled by four corporations, and 35 original trolley corporations in actual operation and control have been reduced to 15. Consolidation has been attended by some increase of public benefits in the way of betterment of service and reduction of fares, but not yet to the same extent as in the consolidation of steam roads in the sate.

The State Commission report at the end of the first decade of trolley expansion in Connecticut, albeit so imperfect in its schedules, shows that the history of the trolleys in the state has been a remarkable one. The speculative opportunism which saw the meaning of the change from horse power to electricity, has, speaking generally, reaped a golden harvest, and is still reaching out into new and larger ventures. Two years ago it seemed as though trolley territory in the state had been almost exhausted. Yet now, with fresh hopes begotten by past profits, with theories of freight and express business derived from the facts of passenger traffic, and under the impulse of general prosperity, petitions have been presented to the sitting Legislature which represent new trolley mileage nearly or quite equal to that of lines already built and operated in the state. The situation thus created is picturesque, with the steam interests apparently hesitating between a battle and a truce, public opinion moving steadily, though slowly, in the direction of trolley restrictions, and a set of new civic problems created by outside "syndicate" control and the blending of lighting and transportation under single ownership. The outworking of these movements and forces in Connecticut during the coming few years, or even months, ought to be an instructive study.

The Lease of the Northern Pacific Lines in Manitoba.

The Northern Pacific has leased its railroads in Manitoba to the Provincial Government, which in turn passes them over to the Canadian Northern Railway. By the terms of the contract, dated Jan. 15, which come to us from official sources, the Manitoba Government leases from the Northern Pacific the entire property, including terminals, rolling stock, telegraph, real estate and personal property. The lease is to run for 999 years, at $210,000 a year for the first 10 years, $225,000 for the second 10 years, $270,000 for the third 10 years, and $300,000 per year for the remaining period. There is an option to buy the property at any time for $7,000,000.

This contract in its entirety is turned over by the Manitoba Government to the Canadian Northern, that company agreeing to pay the annual rentals and to indemnify the Government against all loss in connection therewith. In return the Canadian Northern gives over to the Government absolute control of its freight rates within the Province, and of the through rates between Manitoba and Port Arthur, Ont., which are to be fixed by the Lieutenant Governor in Council. The railroad company further agrees to reduce its passenger rates within the province to three cents a mile, maximum.

This agreement as to freight and passenger rates is to continue until June 30, 1930, during which time the Manitoba Government has undertaken to guarantee the principal and 4 per cent. interest on the bonds of the company's Rainy River branch in Ontario from Port Arthur to Rainy River, at $20,000 a mile. These bonds are payable on the above date, June 30, 1930, and are not to be issued until that line is opened for traffic. The Government takes in exchange a mortgage on all the property and leases of the Canadian Northern and also on the lease and option with the Northern Pacific Company. There is a provision whereby the Government extends its mortgage on the other lines built by the Canadian Northern within the province, a large portion of the bonds of which were guaranteed by the previous government at $8,000 per mile. The Manitoba Government in fixing the rates on the railroad, makes itself responsible for the rentals to the Northern Pacific, as well as for the interest on the bonds. Any deficiency is to be ascertained at the end of each two-year period. The Canadian Northern further agrees to forego its present exemption from taxation in Manitoba after 1905, and, until the maturity of the bonds to pay a sum to be fixed by the Governor in Council, not exceeding 2 per cent. of the gross earnings of its Manitoba lines. The Government has also the option of buying the entire lines at par value in the year 1929.

The Northern Pacific lines in Manitoba, including the extensions recently completed, aggregate 351.04 miles. The main line, connecting with St. Paul and Minneapolis, leaves the North Dakota line at a point just north of Pembina and runs north to Winnipeg, 65.94 miles. From Portage Junction, just south of Winnipeg, there is a branch running west 52.52 miles to Portage la Prairie. About a year ago this was extended on northwest 20.02 miles to Beaver, and last season a branch was run north from near Portage la Prairie to Delta, 15.14 miles. Another branch leaves the main line at Morris, 41 miles south of Winnipeg, and runs west 145.24 miles to Brandon. This is fed by a branch from Brandon running southwest, which was completed this last season to Hartney, 50.94 miles. A spur of 1.24 miles of the Winnipeg Transfer Railway Company makes up the total mileage of the Northern Pacific within the Province. All these lines were built under special charters, chiefly the Northern Pacific & Manitoba and the Portage & Northwestern, but all the stock and bonds are owned by the parent company, The Northern Pacific & Manitoba, which comprises 263.87 miles of the total, has $1,000,000 capital stock and $6,010,000 bonds.

The Canadian Northern, which is to take over these lines, is credited with the ambitious project of a through line from ocean to ocean, besides numerous important branches. Its immediate aim is to connect Port Arthur, Ont., on Lake Superior, with Prince Albert, N. W. T., about 985 miles. Its lines now are in three detached sections. About 60 miles is completed from Port Arthur toward Rainy Lake, leaving a gap of some 225 miles. From the Rainy River another completed section runs west across the northern end of Minnesota, and then northwest to Winnipeg, 152 miles. From Winnipeg the Canadian Northern has running rights to Portage la Prairie, 55 miles, over the Northern Pacific (which now becomes a leased line), and from Portage la Prairie to Gladstone, 36 miles, over the Manitoba & Northwestern. At Gladstone the third section begins, and has been extended northwest 278 miles to a point beyond the Manitoba boundary, and about 270 miles from Alberta. A further extension is projected from Alberta west 350 miles to Edmonton, and ultimately to a point on the Pacific. The company also owns a branch from Stanley, Ont., running southwest 67 miles along the shore of Lake Superior to Gunflint, Minn., which may be extended to Duluth. Another branch runs from Dauphin, Man., west 29 miles to Grand View and another from Sifton Junction, near Dauphin, north 21 miles to Winnipegosis.

Besides insuring the use of more than half the link between Winnipeg and Gladstone, the Northern Pacific lines will carry the company into many new points throughout Manitoba and intensify the rivalry already existing between the Canadian Northern and the Canadian Pacific. A significant feature of the new lease is that the Canadian Northern is forbidden to pool or amalgamate with the Canadian Pacific, and a further interesting feature is the radical experiment in state control of rates.

The counter proposition of the Canadian Pacific for the lease of the Northern Pacific lines in the Province was in substance as follows:

The C. P. R. offered to take over and operate these lines, and pay the Manitoba Government the following rentals: For the first ten years, $220,000 yearly; second ten years, $245,000, and thereafter $300,000 yearly.

To reduce the rate on salt, effective at once, to 15 cents per 100 lbs., from Fort William to Winnipeg.

To make reductions on rates for grain and flour between points in that Province and Lake Superior of 1½ cents per 100 lbs. each year, from Sept. 1, 1901, to Sept. 1, 1903, and of ½ cent per 100 lbs. to 1906.

To reduce the rate on coal to Winnipeg to $2.50 per ton; Portage la Prairie, $3.00, and Brandon $3.35.

To give the Government control of all local rates between points in Manitoba and Lake Superior, subject only to appeal to the courts of the Province in the event of a dispute.

To build with the Government's assistance during the year a branch line from some point near Brandon northwest through the municipality of Daly and Woodworth, a distance of 34 miles; also a branch line from Carman east for a distance of 16 miles; also to extend the Snowflake branch.

In return for these concessions the C. P. R. asked that the present rate of taxation on the company's earnings in the Province of Manitoba of 2 per cent. be reduced to 1 per cent.

We have received an extraordinary number of news paper clippings giving various reports of a recent interview (or perhaps interviews) with Mr. Waitt, General Superintendent of Motive Power of the New York Central & Hudson River Railroad. These clippings do not come alone from New York city newspapers, but from various widely separated parts of the country, showing a pretty general interest in the subject discussed, which subject is compressed air as a motive power for hauling cars. In one class of these reports Mr. Waitt is represented as saying that "I have no doubt that it is feasible to build a motor to haul a train of five cars from 10 to 12 miles at a good rate of speed, as improvements are steadily being made in the use of compressed air as a power. We are a good way, however, from solving the difficult problem of doing away with steam in our tunnel, even with a successful compressed air motor. Besides the train of cars, the new motor must be able to pull the train's regular locomotive, too. Then there is the question of extra space to accommodate the new motors. We will have to have a lot of them if we do all our work at the lower end of this division with them. During part of the day there are two trains a minute running through the tunnel." In another set of reports he is represented as saying that "A compressed air motor at Rome, N. Y., hauled a Pullman car 11 miles, and just escaped being left 'dead' on the track. The best it could do was 25 miles an hour. It had 3,000 lbs. pressure in the reservoir, with a working pressure of 180 lbs. at the start. At the end of the run it had less than 700 lbs. in the reservoir, and only 75 to work with—about enough to keep under motion." We have not consulted Mr. Waitt in this matter, for we think we know pretty well what he would have said, and the two classes of reports are not inconsistent. Trains cannot change engines at or near the Harlem River, the traffic could not be handled if that time were lost, and it would be hard to find yard room for the extra set of engines. Hence the road engines must run into the station, and so far as can now be foreseen these road engines will continue for years to be steam engines, but to avoid smoke and gas the steam must be shut off in the tunnel, and so we come around to Mr. Waitt's proposition that the smokeless motor which takes these trains through the tunnel must be powerful enough to haul the engine as well as the train. What he says about the recent performance of the compressed air locomotive at Rome really has little bearing on the question, and it is not likely that he supposed that it had any other bearing than simply to express the fact that no compressed air locomotive yet built is powerful enough for the New York Central tunnel work. Of course, it is well known that the cited performance of this locomotive is far below what it has actually done in times past, and when it had not as large storage capacity as it has to-day. If the performance referred to was as inefficient as reported in the interview it was no fault of the system of using compressed

air or of the given machine, but it was the fault of somebody who was handling it. The load which a compressed air engine could haul or the speed which it could make would depend upon the size of the cylinders and the working pressure of the air. Its endurance would depend upon the amount of energy stored, which again would be a question of volume and pressure. There is no physical reason why a compressed air locomotive should not haul the heaviest and fastest trains that now pass through the New York Central's approach tunnel. The time during which it could continue to develop this power would come down finally to the permissible weight of the motor.

Changes in the Railroad Terminals at Washington.

The bills for terminal changes on the Baltimore & Ohio and on the Baltimore & Potomac line of the Pennsylvania at Washington, D. C., have passed both houses, and have received the President's signature.

The Baltimore & Ohio, under the requirements of the act, will abandon portions of the Metropolitan and Washington branches, and will build a new elevated line from the present Washington branch, at the south side of H street, five blocks north of the terminal station. It is to run north along the middle of Delaware avenue, five tracks wide, on a masonry viaduct crossing Florida avenue overhead by a two-span, plate girder bridge, or by masonry arches. Thence two lines will diverge, one of two or more tracks northeast to a connection with the Washington branch north of Winthrop Heights station, and the other of two or more tracks north to a connection with the Metropolitan branch at or near Rhode Island avenue extended. The old lines of both branches between the intersecting points are to be abandoned. The plans call for a new freight and passenger station at some point between Second and Capital streets; also for a line outside the city limits connecting the Washington Branch by one or more tracks with the Baltimore & Potomac line of the Pennsylvania. In consideration of the surrender of its present rights within the city, the Baltimore & Ohio is to receive $1,500,000, one-half from the Federal Government and one-half from the District of Columbia.

By the terms of the Baltimore & Potomac bill the Pennsylvania is to extend its present tunnel on Virginia avenue between Eleventh and Seventh streets southeast, so that it shall run on east under the avenue to the west side of Second street, now in Garfield Park. Thence it is to come to the surface and cross New Jersey avenue by bridge and continue as an elevated structure along Virginia avenue and Maryland avenue, following the present right of way to the Potomac River. The intervening streets are to be bridged by iron or steel structures. The old station on Sixth street is to be removed, and a portion of the Mall at the intersection of B and Sixth streets set aside for a new terminal. The approaches to this station are to be changed accordingly. B street at that point is to be widened, and its two sections connected and changes made in Garfield Park. The Baltimore & Potomac is to bear all cost of changes on its right of way, including tunneling and bridging. But costs from property damages, etc., are to be borne half by the District and half by the Federal Government.

The act also provides for the removal of the long bridge over the Potomac by the railroad company and the building of a new structure on practically the same line, to be adopted for railroad purpose only. The Secretary of War is authorized to enter into a contract with the Baltimore & Potomac or any other party within two years from the passage of the act for a new passenger bridge of iron and steel, not less than 500 ft. above the site of the present bridge, for which the sum of $568,000 is appropriated. Street railroads shall have right of way over this bridge, including the Washington, Alexandria & Mount Vernon, now using the Long Bridge.

Some Iron and Steel Riddles.

Why is it that we can raise the strength of soft staybolt iron of, say, 47,000 lbs. per sq. in., to 60,000 lbs. per sq. in. either by heat treatment, or by repeated application of stress? Why is steel coming from the rolls or hammer weaker, and less ductile, than the same steel is after lying a day or two, or, better still, a week?

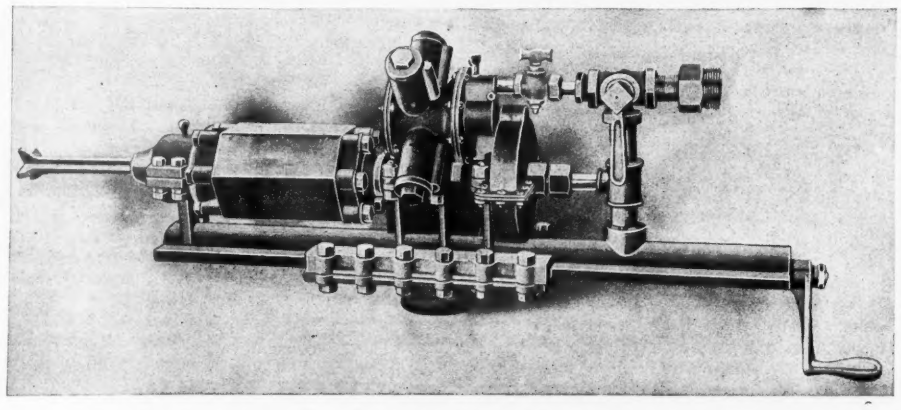
There is no doubt that many tons of suitable material have been either thrown out by the mill people themselves or were rejected by the inspectors because it failed to meet specifications, causing needless vexation and friction simply because neither the one nor the other of the parties knew that steel is in a disturbed physical state after rolling or hammering, no matter how good the material, and should be left to rest, the longer the better. Now, what takes place in the steel during the period of rest?

Another riddle is that we can raise the elastic limit and ultimate strength by a successive application of stresses very much above the original strength. What law, if it is a law, governs this phenomenon? Personally, the author is convinced that many errors of design or inherent weakness of steel have been modified in their probable consequences, and breakdowns averted, by this peculiar property of steel to gain in strength, if allowed to rest after having been subject to stresses within certain limits. It was the knowledge of this fact which enabled the author to fight for steel and defend steel for structural purposes at a time when that metal was not yet a favorite with the engineer by any means. We are all familiar with the discovery of cast iron getting stronger by tumbling in a tumbling barrel, but for all we know it is still an unsolved riddle what the conditions really are producing such effects.—*Paul Kreuzpointner, in Cassier's Magazine.*

A New Rock Drill.

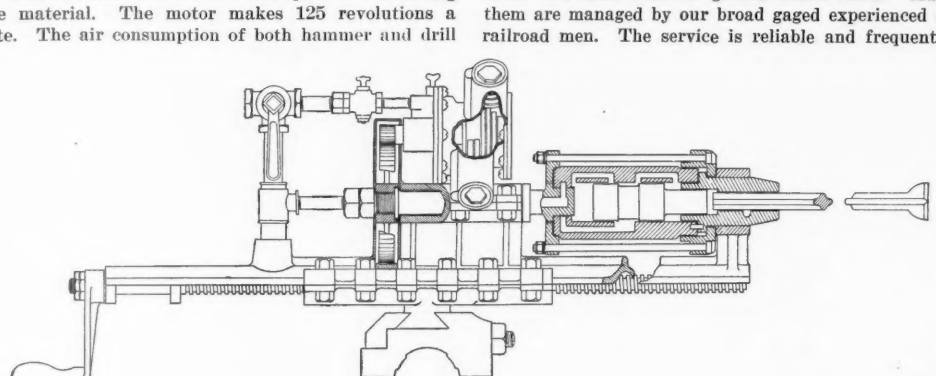
A rock drill in which a pneumatic drill is combined with a pneumatic hammer is the latest tool brought out by the Chicago Pneumatic Tool Co., and is being rapidly introduced in mines and quarries. This is known as the Chicago-Schmucker rock drill, and it is remarkably efficient, light and compact. The largest size weighs 80 lbs. unmounted, and the smallest size weighs 35 lbs.

The construction is shown by the accompanying engravings. As said, it is a combination of a pneumatic hammer and a pneumatic drill, and can be used at any angle. The hammer is of the valveless type, and strikes the drill bit rapid, light blows, while the bit is revolved by being geared to an air motor. In the cylinder of the hammer is set the drill bit, which is made of steel ⅞ in. in diameter and of any desired length. This bit has four longitudinal grooves, and the chuck is cut out to fit the bit so it can be set loosely in the hammer, and requires no fastenings to keep it in place. A tube, having a spiral on the outside, encases the drill bit, and when the bit revolves this serves to remove the cuttings from the hole as the drill advances. Four tongues on the inner surface of the tube engage the grooves in the bit and cause them to turn together.



The Chicago-Schmucker Rock Drill.

The hammer strikes 4,000 light blows a minute with a stroke of 1¾ in. These blows are so light that the jar and shock to the machine is slight, and also the bits can be made of the hardest steel. The great rapidity of working, however, more than makes up for the lightness of the blows, as is shown by the great capacity of the tool. The motor portion of the drill has no other functions than to rotate the bit and the spiral for removing refuse material. The motor makes 125 revolutions a minute. The air consumption of both hammer and drill is shown by tests to be small. In a recent test the Chicago-Schmucker machine drilled 185 ft. in a shift of eight hours where two other drills did but 33 and 67 ft., respectively. Reports from the Matoa Mine at Cripple Creek, Colo., state that this tool has reduced the cost of drilling from $4 a linear foot to $1.35; the air consumption is less than with the older types and the cost of repairs is reduced about 80 per cent. Holes 1⅞ in. in diameter have been drilled in hard granite with a Chicago-Schmucker drill at the rate of 3 in. a minute, and in softer rock at 12 in. a minute.



The Chicago-Schmucker Rock Drill.

The drill is made in three sizes, and the following table gives an idea of the capacity and weight of each size:

Size.	No. 1.	No. 2.	No. 3.
Diameter of hammer, in....	1⅝	1 15-16	2⅛
Length of feed, in.....	18	24	28
Depth of hole machine will drill easily, ft.....	5	8	12
Diam. of hole at bottom, in.	1½	1¾	1¾
Consumption of free air per minute, cu. ft.	18	30	40
Weight of drill unmounted, lbs.	35	55	80

The Bavarian State Railroads have been giving free passes to employees in outlying neighborhoods to go to market to buy their supplies. Having thus provided for their material necessities, they now go a step farther and pass their wives and children on their way to church and school, the employee himself being entitled to two church passes monthly.

Electric Traction for Heavy Railroad Service.

At the January meeting of the Northwest Railroad Club Mr. Edward P. Burch, Consulting Engineer, presented a paper with the above title. He made an elaborate analysis of possible savings in operation, arriving at the conclusion that 53 per cent. of the locomotive fuel could be saved by electric working, making allowance for all losses from the generator to the drawbar, and he estimated that other important savings could be made. This analysis we do not reprint for the reason that a good deal of it is speculative and open to considerable controversy. The extracts which follow are reproduced as giving a convenient summary of the present situation as to electric roads in use:

There is now an electric railroad through Indiana 90 miles long. In the same state a 171-mile road and several 100-mile roads have been started. Dayton, Ohio, Detroit, Mich., have each an 80-mile road. Toledo, Dayton and Detroit have each a 50-mile road. There are over 35 cross-country electric railroads (not street railroad systems) each of which is over 25 miles long. Those now being built, extended or projected for this season's construction are legion.

The characteristics of the best recently built long electric railroads are: A private right of way, ballasted roadbed, easy curves and grades, 75-lb. T-rails, long, comfortable, clean and splendidly lighted double-truck cars; one to three car trains; four 75 h.p. motors per car, rapid acceleration, a maximum speed of 50 miles per hour, swift stops, Westinghouse or other air-brakes, air whistles, arc lamp headlights; trucks, axles, wheels, etc., following Master Car Builders' standards; telegraph, telephone and block signal systems. These passenger roads seldom have freight traffic, although heavy express and mail services are systematized. They are operated under the same rules as govern steam roads. Many of them are managed by our broad gaged experienced steam railroad men. The service is reliable and frequent, and fares are cheap. These are the inducements to travel. The greatly increased density of traffic enables the practice of increased economy in the use of the roadbed and equipment, a fundamental principle to be observed in successful management.

A few years ago heavy electric traction received a setback because of the great loss of power in transmitting the electrical energy. The standard low pressure then used, 600 volts direct current, was not economical in heavy railroad service where the distribution in a given direction from a central station exceeded 10 miles. However, this difficulty was removed by using a different transmission system. Since electricity can be transmitted with a very small loss at higher voltages, the longer roads found it necessary and economical to generate the power at one large station and transmit it at high voltages as alternating current, to from three to eight sub-stations or local distributing points. Examples of this are noted on the Union Traction Company's road through Indiana, the Toledo, Fremont & Norwalk, the Rapid Transit Railway Co.'s system from Detroit, etc., where 16,000 volts is the distributing potential. The Albany & Hudson River Railway & Power Co., the Buffalo & Niagara Falls Electric Ry., the Southwestern Missouri Electric Ry., and many other roads, use a transmission pressure of 11,000 volts. The finest example of this practice (now used by over 50 electric railway systems in the United States) is in connection with the

Metropolitan Railway Co.'s 70,000 h.p. station in New York City, where power at 6,600 volts pressure is distributed to six sub-stations. Improved types of lightning arresters have been developed which make these high voltages safe and the service most reliable. Eighty-mile transmissions are becoming numerous.

In Europe the development of electric traction for heavy railroad service has been most substantial. The largest equipment of locomotives ever made was for the Central London. Forty 48-ton locomotives, each equipped with 800 h.p. in gearless motors, with a speed of 40 miles per hour, are used. Germany leads, however, due to excellent experimental work on heavy trunk lines by the leading electric manufacturing companies, and also to substantial aid from the government. Very high voltages have been successfully used on locomotives when speeded up to 80 miles per hour. Remarkable savings have been made by the use of the electric locomotive in freight switching yards. The Dusseldorf-Krefeld Electric Railroad and the Standstad-Engelberg Railroad are fine examples where freight and passenger locomotives are used on short main lines. In Switzerland the leading electric railroad is the Burgdorf and Thun trunk line, carrying very heavy freight and passenger traffic. Experimental data, complete drawings and elaborate tests of the three-phase motor equipments used have been published by Carus-Wilson. Italy is not behind. Successful lines of importance are the Lugano light tramway, in operation since 1890; the Lecco Railroad, 68 miles long, and the Varese 66-mile road with its heavy service in Northern Italy. The Italian government has approved electric railroad projects of great magnitude, and work is now in progress on important and very long trunk lines, which will be operated for high-speed passenger and heavy freight traffic.

The common features of these important heavy electric railroads on the continent are: No connection with street railroad systems, magnificent roadbeds over a private right of way, heavy cars in three and four-car trains and with the motive power on the locomotive. Heavy grades are mounted—3 to 5 per cent. Water power is used in almost all cases. The transmissions are at about 15,000 volts and the motors are quite universally of a three-phase induction type operating under a pressure of 750 volts—although 3,000 volts are used on the Lecco and other roads.

Recently some of these motors have been manufactured in the United States. The European engineers have attained a high degree of perfection in this development. This is due, in large measure, to the use of alternating current motors. These polyphase motors have advantages over the direct-current types perfected in this country. A matter of superior engineering advantage is that with all loads and grades the speed is practically uniform. On descending grades power is returned to the station. The induction motor is also much simpler and will stand more abuse. These motors are preferable on all long electric railroads. The matter of series-parallel control and of standardization is now well developed and objectionable features are being removed. The polyphase system does not require moving machinery and labor at sub-stations.

Generally speaking, it would be advisable to utilize the water power so abundant in our Northwestern States, where coal is either expensive or poor. Water power when developed without excessive capital expenditure is the cheapest known source of mechanical or electrical energy. A water power station is ordinarily very reliable. The care of the water supply and the turbines is infinitely less than with coal supply, boilers, piping and engines—saving also in interest, depreciation, and especially in labor for operation and repair. A local 10,000 h.p. plant and transmission cables, with a daily maximum output of over 7,000 h.p. requires but eight men per 24-hour run.

Automatic Block Signals on the Baltimore & Ohio.

The Baltimore & Ohio is going to substitute automatic for manual block signals throughout its Philadelphia Division, Philadelphia to Baltimore, about 98 miles, and in connection with the change a number of new side tracks, controlled by interlocked signals, are to be built. The new block signals are to be semaphores, on iron posts, worked by motors and controlled by track circuits, a home and a distant arm on each post. The contract for construction has been let to the Hall Signal Company, of New York.

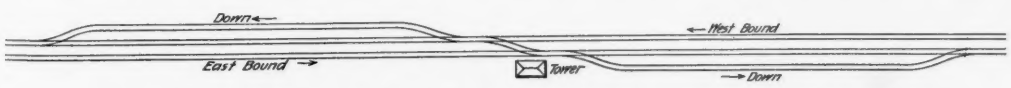
The new sidings or passing tracks are to be each about 6,000 ft. long, and they will be so graded that trains starting out of them will, in all cases, have the advantage of a descending grade. The arrangement is shown in the accompanying sketch. The switches at the entrances of the tracks will be worked from the cabin by rods in the usual manner, while those at the outgoing ends will be controlled from the cabin by electric locks. In connection with the electric lock there will be a signal giving a visual indication of the right of a train to run from the siding to the main track. The ends of these tracks, as of all other side tracks leading to the main track, will have derailing switches to provide against accidental fouling of the main line. Switches will have the usual electrical connections so that they will indicate "stop," at the first block signal in the rear, whenever they are set for the side track.

In connection with this improvement the road is preparing to use green for the all-clear night indication in fixed signals and Baird's yellow glass will be used for the contrary indication in the distant signals. The semaphore arms are arranged to hang precisely vertical when in the all-clear position, after the style of a three-position signal.

The abandonment of the manual signals will enable the company to dispense with 23 block signal offices, but as a number of new interlocking cabins will be established for the control of the side tracks, the reduction in the total cost of signal operation will be little or nothing. These sidings will be eight or 10 miles apart. At these cabins and at stations, where necessary, suitable facilities will be provided for running trains by the manual block system whenever it may be necessary, by reason of the obstruction of one track, or other cause, to operate the road as a single track.

The block sections under the new system will be made short enough to permit the movement of a larger number of trains than at present and at the same time do away with permissive signaling.

We understand that the company will soon let the contract for a similar improvement on the line from Baltimore to Washington, so that within less than six months trains will probably be run by automatic signals all the way from Washington to Philadelphia. As the lines of the Reading and the Central of New Jersey, between Philadelphia and Jersey City, are already equipped, the improvements on the Baltimore & Ohio will complete the automatic block signal equipment of the entire route of the Royal Blue Line trains between New York and Washington.



Arrangement of Passing Side-Tracks on Baltimore & Ohio (Philadelphia Division).

TECHNICAL.

Manufacturing and Business.

It is announced that the Memphis plant of the Southern Car & Foundry Co. will resume work March 4.

Bettendorf bolsters, made by the Bettendorf Axle Co., Chicago, will be used on the 1,000 stock cars ordered by the Chicago, Burlington & Quincy R. R.

W. J. Gillingham, Jr., Signal Engineer of the Illinois Central, has resigned to become General Western Agent of the Hall Signal Co., with office at 1423 Monadnock Block, Chicago, Ill.

Chicago rabbetted grain doors, made by the Chicago Grain Door Co., have been specified for use on the 1,000 box cars ordered recently by the Illinois Central from the American Car & Foundry Co.

Col. W. D. Ewing has been appointed Eastern Manager of the Sterlingworth Railway Supply Co., of Easton, Pa., succeeding C. H. Boaz, as Eastern Sales Agent. Mr. Ewing's office will be at 256 Broadway.

W. W. Salmon, Vice-President of the Hall Signal Co., has resigned to become President of the Taylor Signal Co., with headquarters at Buffalo, N. Y. Mr. Salmon takes the place of Mr. A. W. Hall, who, we understand, has sold out his interest in the company.

The American Blower Co., Detroit, Mich., makers of hot blast heaters, fans, blowers, engines, etc., expects in the early spring to make extensive additions to its plant. The plans include an addition to the steel plate fan erecting shop, to be of all steel construction, and new blacksmith shop, storage warehouse and powerhouse. The present plant will also be remodeled and furnished with considerable new machinery.

Fuller & Kitfield, 2 Kilby street, Boston, Mass., have become selling agents for the product of the Hot Iron Paint Co. This paint is especially applicable to the dull parts of locomotive boilers, and is being used by the Boston & Maine and other New England roads. The claims made for the paint are that it contains no asphaltum, is capable of standing a high degree of heat, and gives to iron and steel a hard, smooth, glossy surface. For locomotive boilers, one application a month is sufficient.

The National Elastic Nut Co., Milwaukee, Wis., has issued a circular calling attention to its elastic, self-locking, steel nuts for use on cars, track, bridges, machinery, etc. This nut is used without nut locks. The elastic nut has a slit on one side, and the thread is a little smaller than the bolt, so that the nut grips the bolt as it is turned on. For general use, not requiring a self-locking nut, common steel nuts are made, as well as machine bolts, track bolts, structural rivets and tie rods.

The Kinnear Mfg. Co. is just finishing a large number of contracts for various railroads for steel rolling doors for freight houses, roundhouses, car shops and ocean piers. Among a few of the buildings recently equipped are the Camden Street Terminal Station and Warehouse of the Baltimore & Ohio at Baltimore; the Pennsylvania Co.'s ocean piers, New York City; the Erie freight station at Youngstown, Ohio; freight houses of the Pennsylvania, at Chicago and Indianapolis, Ind.; car shops of the Texas & Pacific at Marshall, Tex.; roundhouse of the Southern Indiana at Terre Haute, Ind.; freight house for the Cotton Belt at St. Louis, Mo.; freight house for the Soo Line at Minneapolis, Minn.; elevator and warehouse for the Great Northern at Duluth, Minn., and the roundhouse of the Buffalo Creek, at Buffalo, N. Y. The extensive use of the "Kinnear" steel rolling doors for railroad purposes would seem to bear out the company's claims for compactness, durability, ease and speed of operation and fire-proof qualities. This company has just issued its new catalogue "K," which will be mailed upon request to the main office at Columbus, Ohio, or to its branch offices at Chicago, Philadelphia, New York, Boston or London.

At the recent annual meeting of the Philadelphia Pneumatic Tool Co., Philadelphia, Pa., the Board of Directors was increased from three to six members. The new Directors are Thomas Scattergood, Julius Keller and A. L. Phillips. The two latter were brought into the company through the purchase by the Philadelphia Pneumatic Tool Co., of the capital stock and the plant of the Keller Tool Co., which has heretofore been making pneumatic tools exclusively for the Philadelphia Pneumatic Tool Co. This consolidation of the interests of the two companies gives the latter company entire control of the manufacturing as well as of the selling of the product. The same officers were re-elected, viz., J. W. Tierney, President; R. T. Mickle, Vice-President; J. H. Mickle, Secretary and Treasurer. The Philadelphia Pneumatic Tool Co. has recently placed orders for a number of special machine tools for its shops, and has opened an office in Pittsburgh at 1 Wood street, in charge of John K. Henry. Heretofore it has been represented in that city by an agency only. The company expects to soon open an office in Chicago. J. Wilbur Tierney, President of the company, sailed for Europe on Feb. 6, to look after foreign connections of the company.

Iron and Steel.

The Bath Iron Works, of Bath, Me.. has contracted with the Government to build battleship No. 15, to be named the "Georgia." The price is $3,590,000.

Wm. B. Scaife & Sons, Pittsburgh, Pa., have been awarded a contract to build a steel frame trestle approach to the Youngstown works of the National Steel Co.

The Fore River Ship & Engine Co. of Massachusetts has contracted with the Government to build two unsheathed battleships known as Nos. 16 and 17, to cost each $3,405,000, and to be finished in three years.

Negotiations for the consolidation of the Vickers Sons & Maxim Co., Ltd., of England, and the Cramp Ship & Engine Building Co., of Philadelphia, and the Midvale Steel Co., of Nicetown, Pa., are again reported about concluded. It is stated that the consolidated company will be capitalized at $32,000,000. The Morton Trust Co., of New York, and the Chaplin, Milne, Grenbell & Co., are conducting the negotiations.

Proposals for Locks and Dams, Monongahela River.

Proposals for finishing two locks and dams and for building four other locks and dams in the Monongahela River above Morgantown, W. Va., will be received by Major C. F. Powell, Corps of Engineers, U. S. A., at the U. S. Engineer office in Pittsburgh, Pa., until 12 m., March 9. The plans may be seen at his office.

The Perry Ventilator.

Accompanying sketches show the Perry ventilator in cross-section and in front and rear elevations. The intent and operation of the device are apparent from the drawings. It is evident that the hooding of the metal will deflect sparks and that exit is provided for them at the exterior end openings shown at the extreme left. The relations of ingoing and outgoing air volumes are said to be quite satisfactory and it is also said that, taking the place of

the wire screens in the clear-story openings of coaches, these ventilators are effective dust guards. They have been put to practical test in street cars and have demonstrated their usefulness there. They cause no objectionable draft through cars. They have been in use on several smoking cars and on the dining cars of the New York, New Haven & Hartford railroad for the past two years and have there given excellent service. There are now 50 horse and carriage cars of this road equipped with Perry ventilators. The manufacturers guarantee them to give unequaled results in fruit, refrigerator, smoking, and sleeping cars. The ventilator is sold by The Perry Ventilator Corporation, New Bedford, Mass.

Defective Air-Brakes at Nashville.

Below is a report of air-brake cars cut out leaving Nashville yard, Nashville, Chattanooga & St. Louis Railway, December, 1900:

Number of air-brake cars forwarded	8,951
Air-brake cars O. K.	8,910
Air-brake cars cut out	41
Average serviceable air-brake cars per train	15.1

Of the 41 cars cut out, there were blowing at exhaust:

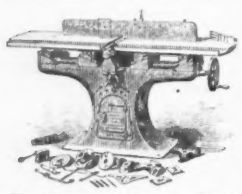
Westinghouse	3	
New York	4	
Landsberger	6	
Boyden	11	24

Of the 41 cars cut out 19 belonged to railroad companies, 22 to private car lines. Of the air-brake cars forwarded 7,622 were equipped with apparatus of the West-

inghouse Air Brake Co., 1,307 with apparatus of the New York Air Brake Co., 8 with apparatus of the Landsberger Air Brake, 14 with apparatus of the Boyden.

A New Variety Wood-Worker.

Messrs. J. A. Fay & Co. have just put on the market their new No. 2 variety wood-worker. This machine is



valuable where a variety of work is done. It will plane out of wind; surface straight or tapering; rabbet door frames and inside blinds; work circular molding, rip-cross-cut, tenon, bore, and rout. The design is the newest and the mechanical advantages and conveniences make it a superior machine. The tables are of iron, of ample size, and can be adjusted vertically and longitudinally, simultaneously or independently.

The Simplon Tunnel.

At the end of 1900 the excavations for the Simplon tunnel extended a distance of 23,463 ft., of which 13,469 ft. was at the north end. In December 3,915 men were employed on the work, 2,663 inside. There was some trouble from water.

The Union Iron Works at San Francisco.

The *Marine Review*, describing these shipyards, says: "Not the least novel feature of this plant is the hydraulic lift dock, a great steel platform working on the principle of an elevator, and raised by 36 hydraulic cylinders, 31 in. in diam., having a stroke of 15 ft. Vessels of 6,000 tons weight, and drawing 25 ft. of water can be raised to the level of the wharf by this dock. The steel platform itself is 436 ft. long by 60 ft. wide. The valve mechanism for each cylinder is so arranged that if one cylinder has a tendency to lag behind its valve will open wider, and if it rises too fast the valve will be closed and the cylinder will be brought into line, so that the dock will always be level when coming up, and the strains be uniformly distributed. Parallel to the dock and separated from it by a large wharf, are the fitting out bays where naval and merchant vessels are finished. On this wharf is the 100-ton shears, used in placing the boilers and engines, armor plate, guns, and all manner of heavy weights on the vessels building."

Germany's Pig Iron Production.

According to a German report just published, the production of pig iron in Germany (inclusive of Luxemburg) amounted in 1900 to 8,351,742 tons, as against 8,029,305 tons in 1899.

A Locomotive for Spain.

The Junta de Obras del Puerto de Huelva, of Huelva, Spain, invites bids for a tender locomotive to be used at the port of Huelva. Offers must reach the above authorities no later than March 21, 1901.

Pressed Steel Car Company.

The expected issue of $5,000,000 5 per cent. bonds of the Pressed Steel Car Company is advertised. The President of the company, Mr. Hoffstot, says that "to meet the great demand for the company's products, increased facilities have been provided by which the capacity of the works has been more than doubled since the company's organization. The indebtedness created to carry on this increased business is now funded into fixed maturities by the issue of these notes and necessary additional working capital provided." From the annual report of the company it appears that the net earnings for the year ending Dec. 31 last, after payment of interest charges, amounted to over $2,000,000. The new bonds are secured by a first mortgage to the Morton Trust Company covering all real estate, buildings, machinery, etc., now owned or to be acquired and all of the United States patents. The President says that by this means the company secures extra working capital, and he believes that the interest charges will not be increased inasmuch as the company has had to disburse a good deal for interest on borrowed money which has been charged to operating expenses.

Saving in Engine Fuel.

The Master Mechanics' committee on the most promising direction in which to effect a reduction in locomotive coal consumption, sends out a circular, of which the following is part: "Your committee respectfully request that you not only answer fully the questions, but if in your judgment there are other possibilities not outlined by the committee's questions, that you give your opinion on them also. The committee would like to have all replies in by March 10; answers to be addressed to A. E. Manchester, Assistant Superintendent Motive Power, Chicago, Milwaukee & St. Paul Railway Company, West Milwaukee, Wis.

"1. What, in your opinion, is the most promising direction in which to effect a reduction in locomotive fuel consumption?

"2. Have you demonstrated the practicability of the methods you recommend? If so, with what results?

"3. If a special device, kindly furnish the Committee with blue prints and a plan of its application and use, together with an estimate of the cost for application and of the economy to be effected.

"4. Is it a patented device?

"5. Is it applicable to existing engines, or only to new construction?"

Interlocking.

The Philadelphia & Reading has let to the Standard Railroad Signal Co., of Troy, N. Y., a contract for a low pressure pneumatic interlocking plant to be put in at Nicetown Junction, Philadelphia. The large pneumatic machine put in by the Standard Company at Wayne Junction was finished in January and is now in service.

THE SCRAP HEAP.

Notes.

The newspaper train of the Delaware, Lackawanna & Western now leaves New York at 2 a. m., and arrives in Buffalo at 1 p. m. The fast mail of the New York Central heretofore starting at 4:35 a. m. now leaves New York at 3:15 a. m. This train reaches Chicago at 7:10 the next morning; and it is to have a connection to Cincinnati, due there at 6:50 a. m. This train carries passengers.

Vice-President Oscar G. Murray, of the Baltimore & Ohio, has issued an order that hereafter "civil service" rules must be applied in the employment and promotion of persons in the service of that company. Only in cases decided to be exceptional by the highest executive officers can any outsider be taken into the road's employ over the heads of old employees. In cases of emergency heads of departments may employ new applicants, but the officer must be reasonably certain that no employee in his department is capable of filling the position; and if the appointment to be made is in the operating department the whole matter must be referred to the General Manager.

The Railroad Commission of Mississippi has adopted resolutions declaring that no good purpose is to be subserved by instituting proceedings to prevent the consolidation of the Southern Railway and the Mobile & Ohio, and the case before the Commission is dismissed.

New employees of the Brooklyn Rapid Transit Company hereafter will have to submit to being photographed. Each man will have his picture taken as soon as he is appointed and will give two copies to the railroad company. One copy will be kept in the general office, and the other will be sent to the Division Superintendent. It has been found that men who had been discharged for dishonesty or for other good reasons would in some way get back under an assumed name.

The first annual report of the Pension Department of the Pennsylvania Railroad says that the pensions paid during the year amounted to $244,019.97. The retirements during the year numbered 1,292 persons, of whom 1,149 were 70 years of age or over, and 143 between 65 and 69 years old. Of the latter, 83 were retired at their own request, on the recommendation of their employing officers; the remainder, 60 in number, purely upon the recommendation of their employing officers. One hundred and two pensioners died during the year, 95 of whom were of the 70-year or over class, and 7 of the 65 to 69-year class. The number of employees (all lines east of Pittsburgh and Erie) is now about 80,000. The report says that the employees who have been retired and are receiving benefits have indicated their gratification and pleasure by marked expressions of appreciation. The popularity of the department is widespread, not only among the pensioners, but also among the many who in expectation of long years of life hope to realize in their declining days the fruits of so worthy an institution.

Traffic Notes.

Chicago press despatches say that the Wisconsin Central, the Chicago Great Western and the Minneapolis & St. Louis have agreed to join the Western Passenger Association.

The quantity of grain in store now at Chicago, St. Paul and Duluth is said to be 50,000,000 bushels, and it is reported that nearly all of this is to be shipped eastward, by rail, on contracts already made.

Press despatches from Buffalo say that the New York Central has bought the Niagara elevators in that city, fronting the Buffalo River near Chicago street. The elevators, three of them, have an aggregate capacity of 2,000,000 bushels.

Chicago newspapers say that there is nervousness in that city because unusually large quantities of grain are going to Europe by way of Galveston and New Orleans. The roads which carry grain to gulf ports say that the movement in that direction is not due to rate cutting by the railroads, but to advantages in quality and inspection, which buyers can get only at Galveston and New Orleans.

A press despatch from Montreal says that the question of immigrant traffic through New York, which has been under discussion for some time, has been amicably settled. The Western lines will acknowledge the right of the Canadian Pacific to participate in this business; the roads have agreed to division of business on an all-round basis, the Canadian Pacific to have a share of the traffic through New York, Boston, Philadelphia and Baltimore, and the United States carriers to get a share of the business through Canadian ports.

Some of the newspapers are printing a copy of a contract said to have been agreed to by the Louisville & Nashville and the Cincinnati, New Orleans & Texas Pacific under which these roads agree, for the purpose of moderating the competition between them on passenger business, to divide certain territory in Kentucky, assigning specified districts to each company, the same not to be operated in by the other company. The reporters are wondering how the traffic officers could dare to thus defy the anti-trust law.

Among the exactions which the American public puts up with is the storage charge on baggage left in railroad stations. The storage of baggage is an accommodation which the railroads owe to the traveling public, and for which in return they should be adequately rewarded; but the actual storage charge is so out of proportion to the service rendered as to amount to a fine for not removing baggage promptly. Every European traveler will remember the convenience of the system by which baggage may be left at a charge of a cent a day for each piece. An equivalent charge in this country would be, say, 10 cents for the first and 5 for each succeeding day. The 25 cents a day charged by most of the railroad companies is excessive.—*New York Evening Post.*

On Tuesday of this week the Interstate Commerce Commission held an inquiry at Buffalo concerning the rates by the elevators of that city. P. G. Cook, Secretary of the Western Elevating Association, gave testimony concerning the grain business. All the elevators at Buffalo, but one, are controlled by this association, and the association has contracts with all the railroads to the East. The uniform rate is half a cent a bushel, including 10 days' storage. The actual cost for elevating is from ¼ to ⅜ of a cent. Spencer Kellogg, proprietor of the one independent elevator, testified that in shipping wheat to New York he had to pay half a cent more per hundred pounds than was paid by other elevators. Mr. Kellogg was excused from giving further testimony, on account of litigation pending between himself and the Elevating Association.

Technical Schools.

Rensselaer Polytechnic Institute.—Mr. P. W. Henry, C. E., Vice-President and General Manager of the Barber Asphalt Paving Company, delivered a lecture before the students of the Rensselaer Polytechnic Institute at Troy, N. Y., Feb. 15. His subject was a sketch of the Asphalt Paving Industry.

Director P. C. Ricketts has been elected President. (See the personal notes.)

Purdue University.—Hon. Charles A. Prouty, member of the Interstate Commerce Commission, delivered, on Jan. 21, an address before the engineering students of Purdue University. His subject was "The Relation of the Railways to the People," which he treated by presenting in outline the work of the Interstate Commerce Commission. Mr. Prouty began by calling attention to the great influence exerted by American systems upon the progress of the country and discussed the important part played by railroad rates in the development of commerce. He showed how the magnitude of the interests involved demands governmental regulation of rates, and in this connection explained the work of the Interstate Commerce Commission which is charged with the duties of supervising and regulating such affairs. The discussion was entirely impartial and was much enjoyed by the students.

Soldering Aluminum.

Upon attempting, with any ordinary solder, to join sheets of the metal, it is noticeable that the mixture does not take hold, but tends rather to run off, or perhaps it will chill, refusing to tin the sheets, and rarely adhering to the aluminum. The reason of this behavior is that there is always present a thin, continuous coating of oxide, which effectually prevents the solder from getting to the true metal beneath. This thin, almost invisible, skin of alumina, or oxide of the metal, is of instantaneous formation, and the surface of the metal may be scraped or filed without even temporary relief because of the immediate renewal of the coating. Dr. Joseph W. Richards, of Lehigh University, conceived the successful practice of incorporating into the composition of the solder an ingredient that would remove the oxide film during the process of soldering, thereby preserving the surfaces clean until the union of the parts had been accomplished. The solder devised and patented by Dr. Richards carries in its make-up an alloyed flux of phosphorus in tin, the theoretical necessity of the simultaneous action of the flux and the taking hold by the solder being confirmed during many years by the satisfactory results obtained in actual commercial practice. The high heat conductivity of aluminum is another characteristic of this strange metal, and the refusal of many solders to perform their expected duty is traceable to it. The aluminum quickly and readily absorbs the heat from the soldering iron, and the temperature of the tool is thus so far reduced that the solder "freezes" at the joint and failure ensues. To overcome this difficulty, which arises in large work particularly, it is necessary to keep the soldering iron very hot, and oftentimes it tends to the betterment of the result to apply heat likewise to the parts to be joined.—*Joseph A. Steinmetz in Cassier's Magazine.*

Another Pass Fraud.

We have from Mr. Kendrick, of the Northern Pacific, the following letter:

"We have recently received a number of letters and telegrams with respect to a man representing himself to be C. F. Caines, who has made application to various railroad companies for free transportation, presenting a letter purporting to have been issued by this company testifying to his having served it in various capacities, and recommending him to those concerned. Nearly a year has passed since his operations were first called to our attention. In September, 1900, a letter setting forth the circumstances, was sent to the managing officers of railroads throughout the middle South and West. He has within the last few days appeared in St. Louis. The letter heads which he uses are apparently of his own manufacture, though the printing is similar to our standard. I have in my possession two of the fraudulent documents, which have been sent to me. They are addressed 'To Whom It May Concern,' but do not read alike, are stamped 'Vice-Pres., Office N. P. R. R., St. Paul.'"

"Subscription" Books and Enginemen.

A recent despatch from Port Jervis says that the wages of a lot of Erie enginemen were garnisheed by a Chicago publishing house. These enginemen had subscribed for a book published at $15, and included in this book were to be sketches and portraits of such locomotive engineers as chose to pay $10 additional. The book was not published at the time agreed on, and the enginemen in question declined to receive it or pay for it, hence the action. We hope that the legal department of the Erie will protect the men in case they have been swindled, which is very possible.

Trade With the Philippines.

A statement published by the Division of Insular Affairs of the War Department shows the commerce of the Philippine Islands for the seven months ending July 31, 1900. The total value of imports into the islands amounted to $13,309,554, an increase of over 40 per cent. over the same period in 1899. The exports to all countries combined amounted to $15,624,015, an increase of 34½ per cent. Imports from the United States amounted to $1,092,726, a gain of 78 per cent., and exports to the United States to $1,826,678, a decrease from the previous year.

Speed of Street Cars.

The Metropolitan Street Railway of Washington, D. C., has put into effect a new schedule which reduces the

speed of certain of its large cars from 12 to 4 miles an hour. The change is made to meet the wishes of many residents and large owners of residence property along the road who have made formal complaints to the Commissioners of the District of Columbia about the noise and danger, and the unpleasant vibration of houses, caused by the running of the large cars. Several hundred prominent business men have petitioned the Commissioners to take action to prevent further loss of life at street crossings, and it is understood that the Board has decided to again make and enforce the rule of stopping at the "near" side of all crossings in future.

Suspended Subsidies of the Ontario Government.

The sum of $3,056,900 voted by the Ontario Government to the following roads still stands unexpended at their credit, awaiting the completion of their several branches or extensions. These amounts are due to the roads named in cash up to Dec. 31, 1900, and can be drawn any time, as soon as earned.

Bay of Quinte, 30 miles, $90,000; Brockville, Westport & Sault Ste. Marie, 55 miles, $165,000; Central Counties, 14 miles, $28,000; Central Ontario, 21 miles, $63,000; Cobourg, Peterboro & Marmora, 13 miles, $26,000; Haliburton, Whitney & Mattawa, 48 miles, $144,800; Irondale, Bancroft & Ottawa, 55 miles, $60,000; Parry Sound (James Bay), to Sudbury, 90 miles; Sudbury to Lake Abbittibi (James Bay), 175 miles, $620,000; Manitoulin & North Shore, 41 miles, $123,000; Northern & Pacific Junction, 1½ miles, $7,500; Ontario, Belmont & Northern, 7 miles, $22,400; Ontario, Hudson Bay & Western, 240 miles, $480,000; Ontario & Rainy River, 280 miles, $1,120,000; Port Stanley, Strathroy & Port Frank, 10 miles, $20,000; Interprovincial Bridge, Ottawa, $50,000; International Railway bridge, St. Lawrence River, $35,000.

The River-Harbor Bill.

The River and Harbor bill was reported to the Senate Feb. 19 with the following statement: "The bill as it came to the Senate appropriated the sum of $22,792,711 for expenditure during the fiscal year ending June 30, 1902, and authorized continuing contracts for the completion or prosecution of certain improvements to be paid for by future appropriations, amounting to $37,142,704. The grand total was therefore $59,935,415. In the bill as reported to the Senate, these totals are as follows: For the fiscal year ending June 30, 1902, $21,598,830; amount of continuing contracts authorized, $28,565,696; total, $50,164,526. That is a reduction of appropriations amounting to $1,193,881, and of authorized contracts the sum of $8,651,264."

The New Lichaja-Kriwomuzginskaja Railroad.

Some time ago a railroad was opened for traffic in the Don district in Russia, which is of some economical importance. It branches off from the station of Lichaja, about 105 miles from Rostov on Don, on the Rostov-Voronesh Railroad, and runs in an easterly direction until it connects with the Kalatch-Zaritzin railroad, thus establishing direct connection between the Don and Volga rivers. The line is single-track, has a length of 205 miles, has 13 stations, and three large bridges, of which the great Don bridge near Kalatch is the largest. It is the property of the Russian South Eastern Railroad Company, and crosses the Donetz coal and iron district. It is hoped that the line will influence the further development of this great metallurgical region of Southern Russia. It is in direct competition with the Vladikavkaz railroad, and will doubtless take some of the passenger and freight traffic of that line.

Frost and Mortar.

A number of 16 x 16 in. sq. x 8½ ft. high brick piers were laid in lime mortar composed of Rockland lime and Sullivan County washed brook sand (A1 quality). Being laid in frosty weather and freezing before they had thoroughly dried they heaved 2 in., when the building was proceeded with; in the spring the heat thawed out the mortar and they dropped 1¾ in.

Foreigners in Spanish Railroads.

Deputy Consul General Hanauer writes from Frankfort: "A royal decree lately published in Spain discriminates against foreigners by giving concessions for the construction of railroads and tramways only to Spanish subjects or companies which have their chief offices in that country. The order provides that shares and mortgage bonds must be payable in Spanish coin, as also the interest and dividends upon the same; that two-thirds of the board of directors must be subjects of and reside permanently in Spain. The same rule applies to executive officials in the boards of supervision and management, as well as to engineers and superintendents. Deviations from this rule shall only be allowable when considered necessary by the Government.

Electric Railroads in Canada.

Commercial Agent Beutelspacher reports: The Dominion statistician has compiled figures regarding the thirty-four electric railroads of Canada. During the year ended Dec. 31, 1899, 630 miles of track were used and the total number of miles run by cars was 29.646,847. Passengers carried numbered 104,033,659, which was equal to carrying every man, woman, and child in the Dominion twenty times. Compared with the previous year, the number of passengers increased nearly 9,500,000 and the number of miles run over 1,000,000. The amount of paid-up capital is $21,700,000.

German Canals.

The new canal bill introduced in the Prussian Diet is an extension of the canal project of 1899 (rejected by the lower House of the Diet that year). The 1899 project was to connect the Rhine with the Elbe and to canalize the Weser from Bremen to Minden. The new plan, in order to avoid the objection against the former measure —that it would benefit only the western part of Germany —extends the system to all sections of the Kingdom and comprises seven distinct enterprises, at a total cost of $92,584,594. The estimated cost of the Rhine-Elbe Canal is $62,066,758; the ship canal from Stettin to Berlin, $9.877,000; the waterway between the Oder and Vistula, with the channel making the Warthe River navigable from Posen to the junction of the Netze, $5,386,178; improving the Lower Order and Upper Havel, $9,755,382 and $2,301,460, respectively; canalizing the Spree, $2,221,968.

She "Struck Out for the North."

A peculiar mistake occurred last Friday morning on the main line of the Northwestern which resulted in the westbound fast train, No. 1, losing its way and running about seven miles on a branch line. In charge of the engine was a new crew, which was not familiar with the road, and as the train pulled out of Ames early in the morning the switchman did not turn the switch which shut off a branch from the main line. and the result was that the train, instead of speeding off to the west, struck out northward toward Eagle Grove. The road was new to the engineer, and the conductor was so busy that he did not notice the mistake until the train had been out of Ames forty-one (?) minutes. Then the train had to flag back, and this was slow work. When it struck the main line again, some time was made up, but at that it was two hours late arriving in Omaha.—*Journal*, Sioux City, Ia., Jan. 29.

Troubles in Heating Cars.

Two suits have been brought against Austrian railroads for damages resulting from improper heating of cars. One passenger caught cold because the car was not warm enough, and the other decalres that an overheated car caused his ailment. Instances of both kinds may be found outside of Austria.

Women on Railroads.

One of the Russian railroads some time ago asked and received permission of the government to employ women as clerks and auditor's employees. Since then a great many railroad companies have followed its example. Now Prince Hilkoff, the Minister of Transportation, has decided to permit women to attend the courses of instruction for railroad employees, which are established in several high schools and colleges, and generally last for a year and a half. This will enable them to be candidates for a great number of positions in the station and other indoor services.

Mississippi River Commission.

A bill has passed the House and Senate providing that the headquarters and general offices of the Mississippi River Commission shall be in some city or town on the Mississippi River to be designated by the Secretary of War, and that meetings of the Commission, except those held on Government boats during semi-annual inspection trips, are to be held at such headquarters, the time to be fixed by the President of the Commission, who shall give due notice to members and the public. The headquarters are now in St. Louis, but in explanation of this act it was stated that so many meetings are now held East that it is a hardship on the members and others.

Acetylene Gas Lighting in Germany.

At the second annual congress of the German Acetylene Society, held at Düsseldorf recently, a prize of $250 was offered for the best design of a table lamp to burn acetylene gas. A similar sum was immediately added by the carbide manufacturers. Acetylene is used for cooking purposes in several towns, and at Ellerbak it is supplied at a special price for driving engines. It is used in a number of passenger stations, a freight station at Hamline, and in the Poelgate station in Sussex, England.—*Municipal Engineering.*

Work at Newport News.

No other shipyard in the country has as much tonnage under construction as the Newport News Ship Building & Dry Dock Co., Newport News, Va. This is the only shipyard to receive four contracts in the recent apportionment of government vessels—one battleship, two armored cruisers and one protected cruiser. The thirteen vessels now under construction at the yards, or for which contracts have been received, aggregate in displacement 140,000 tons and will cost about $27,000,000. There are at present 6,500 men employed at the yards and the new contracts for warships will entail the necessity for the employment of 1,500 more. During the year material progress has been made on the battleships "Illinois" and "Missouri" and the monitor "Arkansas." Keels were laid for the two large Pacific Mail steamers "Siberia" and "Korea," and keels were also laid for three Morgan liners, "El Alba," "El Dia" and "El Libre." The keel of the fourth, "El Siglo," will go down very shortly. These vessels are each 400 ft. long over all. The monitor "Arkansas" was launched last November. The battleship "Illinois" is nearly ready for her trial trip. The battleship "Missouri" is on the ways and is about 20 per cent. completed. All of the merchant ships now on the stocks will be launched during the early months of the present year.—*Marine Review.*

Hungarian Railroad Cars for China.

The Raab Engine & Car Works have been awarded a contract for 1,000 freight cars for China at the price of 3,400 crowns ($690) per car. In all, 5,000 cars are said to have been ordered for Chinese railroads, of which 3.000 were ordered in Germany, 1,000 in the United States and 1,000 in Hungary. Some time ago the same Hungarian company received an order for freight cars from Egypt.

Austrian Steamship Orders for England.

The Adria S. S. Co. of Fiume, recently placed an order for six steamers with Messrs. Wigham Richardson & Son, of Newcastle, and an order for four steamers with the firm of J. Dobson, of Newcastle.

Belgian Rails for Portugal.

The John Cockerill Company, of Seraing, Belgium, has received an order for 5,000 tons of rails from the Portuguese Railroads. The price was 115 francs per ton c.i.f., Antwerp.

LOCOMOTIVE BUILDING.

The United Collieries are having two engines built by the Baldwin Locomotive Works.

The Lake Shore & Michigan Southern is said to be considering ordering 25 locomotives.

The Virginia & Truckahee has ordered two engines from the Baldwin Locomotive Works.

The Colorado & Southern has ordered 10 locomotives from the International Power Co.

The Missouri, Kansas & Texas has ordered 12 freight and five passenger engines from the Baldwin Locomotive Works. It is reported that the order will be increased to 30.

The Suffolk & Carolina has ordered one American type locomotive for passenger service, with 13-in. x 18-in. cylinders, from the Baldwin Locomotive Works.

The Chicago, Milwaukee & St. Paul has ordered four consolidation, 34 10-wheel compound freight and nine Atlantic type engines from the Baldwin Locomotive Works.

The Baltimore & Ohio is reported as about to order 105 locomotives. It is probable that the road will soon make a contract for this motive power. We stated, last March, in noting an order placed at that time with the Baldwin Locomotive Works for 100 engines, that the road would later on order 112 more locomotives. In our issue of Jan. 25 we noted an order of 20 compound consolidation engines placed with the Baldwin Locomotive Works.

CAR BUILDING.

The Colorado & Southern is reported in the market for six passenger coaches.

The Louisiana & Arkansas has ordered 100 cars from the Barney & Smith Car Co.

The Northern Pacific has ordered 450 stock cars from the American Car & Foundry Co.

The Pittsburgh, Bessemer & Lake Erie has ordered 50 box cars from F. M. Pease, Chicago.

The West Virginia Central & Pittsburgh is having two coaches built by the Jackson & Sharp Co.

The Chicago, Burlington & Quincy is getting prices on 250 hopper bottom coal cars of 80,000 lbs. capacity.

The Union Pacific is again reported to be in the market for 1,000 box cars and 300 or 400 furniture cars.

J. A. Bunting has ordered 35 tank cars from F. M. Pease, Chicago, and is reported in the market for 50 more.

The Duerr Construction Co. has ordered 60 cars from the American Car & Foundry Co. They will be built at Berwick.

The Charleston, Clendennin & Sutton has ordered 20 freight cars from the American Car & Foundry Co. They will be built at Huntington.

The Choctaw, Oklahoma & Gulf is in the market for 500 coal cars of 80,000 lbs. capacity. It is reported that the road will also order some cars for passenger service.

The Southern Pacific is about to order a large number of freight cars. We have no definite information at this time, but the number is said to be 3,000 or 4,000 cars of various kinds.

The Louisville & Nashville order with the Mt. Vernon Car Mfg. Co., mentioned last week, calls for 250 box cars of 65,000 lbs. capacity. They will measure 36 ft. long, 8 ft. 3 in. high and 7 ft. high under plates. Wood will be used throughout. The special equipment includes Sterlingworth brake-beams, Wagner doors and improved Chicago roofs.

BRIDGE BUILDING.

ATLANTA, GA.—It is reported that the Chief Engineer of the Central of Georgia R. R. has made plans for the proposed viaduct at Peters street.

BALTIMORE, MD.—An order has been introduced in the City Council granting authority to the Chesapeake & Atlantic Ry. to build a bridge across Light street.

BOSTON, MASS.—B. T. Wheeler, Superintendent of Streets, estimates the cost of a bridge at Midway street over the New York, New Haven & Hartford at $28,000. Bids are wanted, Feb. 25, for the northern approach to the Atlantic avenue bridge. Address City Engineer, Wm. Jackson.

BUFFALO, N. Y.—A bill has been introduced in the House of Representatives and referred to the Committee on Interstate and Foreign Commerce to extend the time for building the Grand Island bridge, proposed by the Grand Island Bridge Co., in which Chas. D. Marshall is interested.

A bill has been introduced in the State Legislature enabling Erie County to bond itself for $1,000,000 to build the proposed Grand Island bridge.

CARTHAGE, TENN.—A bill has been reported favorably in the House of Representatives authorizing a bridge across the Cumberland River at Carthage.

CEDAR FALLS, IOWA.—The Board of Supervisors of Blackhawk County has rejected all bids for a highway bridge, over Cedar River, and are now planning to build a different bridge for the sum appropriated by the county, $20,000.

CHATHAM, ONT.—Bids are wanted, according to report, by J. C. Fleming, County Clerk of Kent, for a steel bridge over the River Thames, 130 ft. long, of four spans, with a 16-ft. roadway.

CHILLICOTHE, OHIO.—Bids are wanted, March 5, for a 135-ft. bridge over the north fork of Paint Creek. A. W. Jones, County Surveyor.

CINCINNATI, OHIO.—The Board of Public Service is reported to have adopted plans for the proposed viaduct over Crawfish Hollow, which is to cost about $175,000, and be 900 ft. long. (Nov. 9, 1900, p. 747.)

COLUMBIA, FLA.—Frank Drew, at Mayo, Fla., General Manager of the Drew Lumber Co., of Columbia, wants bids at once for an iron drawbridge 212 ft. long over Suwanee River, with a draw opening of not less than 50 ft.

DALTON, MASS.—At the annual town meeting, March 25, a vote will be taken on the question of building an iron bridge across the West branch of the Housatonic River.

DAVID CITY, NEB.—John J. Graham, County Clerk, will receive bids, Feb. 23, for bridges to be built in the county during 1901.

EASTON, PA.—Bids are wanted, March 1, for the steel superstructure of the two-span bridge at this place. Address A. J. Cooper, County Engineer.

FALL RIVER, MASS.—City Engineer Philip D. Borden informs us that plans are well advanced for the proposed abolition of grade crossings in Fall River. It is expected that the work will be begun in the early spring. Highway bridges will be built at Ferry street, Walnut street, New street and at Clark street. A viaduct will connect Central street with Anawan street. Railroad bridges will be built at Turner street, Pearce street, President avenue, two at Bunnel street, one each at Collins street and Davol street.

FLORIDA.—The Senate has passed a bill authorizing the Alafia, Manatee & Gulf Coast Ry. to build bridges across Manatee River and Gasparilla Sound.

FREEPORT, ILL.—It is stated that the Board of Highway Commissioners and the County Supervisors have agreed to build the proposed bridge across Pecatonica River at Stevenson street, at a cost of about $20,000. Geo. W. Graham, City Engineer.

GRAND RAPIDS, MICH.—The Board of Public Works wants bids, until March 8, for a concrete-metal bridge 65 ft. span and 100 ft. wide, and for rebuilding a 66-ft. girder bridge, known as the Bridge street bridges over the west side power canals. Dudley E. Waters, President; L. W. Anderson, Engineer.

GREENSBURG, PA.—The Commissioners of Westmoreland County have let a contract for an iron bridge across Loyalhanna Creek at Latrobe to the King Bridge Co., of Cleveland, for $11,300. There were 11 bidders.

GREENVILLE, ALA.—The County Commissioner of Butler County will hold a special meeting on March 6 to agree on bridges.

GRENADA, MISS.—We are told that the Virginia Bridge & Iron Co. has the contract for the drawbridge over Yalabusha River for Grenada County, for which there is a bill before Congress. The structure is 300 ft. long and the contract price $20,000. (Jan. 25, p. 67.)

HARDIN, ILL.—Bids are wanted, March 18, for the steel superstructure of the bridge over Crawford Creek. Chas. Flamm, County Clerk.

HERNDON, PA.—We are told that the Grand Jury of Northumberland County has accepted the report of the viewers for a bridge between Northumberland and Snyder counties over the Susquehanna River, between Herndon and Port Trevorton.

HICKORY, N. C.—A free bridge is proposed over the Catawba River between Catawba and Alexander counties. Address J. D. Eliot.

KANSAS CITY, MO.—Local reports state that the Kansas City & Atlantic R. R. will build the Winner bridge across the Missouri River. Thomas R. Morrow, Attorney.

LUMBERTON, N. C.—The Senate, on Feb. 16, passed a bill authorizing the Carolina Northern to build a bridge across the Lumber River, at Lumberton, Robeson County, N. C.

MCCONNELLSVILLE, OHIO.—The Osborn Company, of Cleveland, is reported making plans for a 125-ft. bridge at this place over Muskingum River.

MARIETTA, OHIO.—The Ohio River Bridge & Ferry Co. has a franchise from the city of Williamstown, W. Va., for its proposed bridge over the Ohio River. The structure will have a main channel span of 650 ft., and a back channel span of 600 ft. (Oct. 12, 1900, p. 679.)

MICHIGAN CITY, IND.—Bids are wanted, March 14, according to report, for the drawbridge proposed over the harbor which is to be 182 ft. long, 28 ft. wide and cost about $15,000. H. M. Mills, City Engineer. (Feb. 1, p. 86.)

MILWAUKEE, WIS.—The Common Council committee on bridges has recommended that new bids be secured for building the Grand avenue bridge over Milwaukee River.

MINNEAPOLIS, MINN.—City Engineer Sublette has made plans and specifications for the proposed Washington avenue bridge. These plans provide for a roadway 36 ft. wide, and for two 6-ft. walks, the estimated cost being $55,000.

Local reports state that plans have been made for replacing the Chicago, Milwaukee & St. Paul "Short Line bridge," by a double track steel structure.

MOBILE, ALA.—The House, last week, passed bills authorizing the Mobile & Western Alabama R. R. to build bridges across the Warrior River between the counties of Walker and Jefferson, and across the Tombigbee River between the counties of Marengo and Choctaw, below Demopolis, Ala.

Rudolph Benz, at Mobile, proposed to build a bridge across Dog River. He is to own it 20 years, at the expiration of which time the county will have the privilege of buying it. A bill to allow Mr. Benz this franchise is now before the Legislature.

MUSCOGEE, OKLA. T.—A bill has been introduced in the House of Representatives, authorizing the Muscogee & Clarksville Bridge Co. to build a bridge across the Arkansas River between the places named, in the Creek Nation.

NEWARK, N. J.—The Pennsylvania R. R. has made application to the Board of Street and Water Commissioners of Newark to build two overhead bridges for the elimination of all grade crossings on the line of the Waverly & Passaic branch across the Meadows.

NEW HOPE, ALA.—A movement is on foot to have the counties of Marshall and Madison build a drawbridge at New Hope, where a wooden structure was recently burned. A draw is necessary because the stream is now navigable.

NEW YORK, N. Y.—A bill has been introduced in the State Senate to enable the Commissioner of Highways of New York to build, reconstruct, or extend the bridges or viaducts across the tracks of the New York & Harlem Railroad at the Gun Hill Road, and across the tracks of the Spuyten Duyvil & Port Morris Branch of the New York Central & Hudson River Railroad at Mott, Elton and Washington avenues.

PEORIA, ILL.—The Board of Highway Commissioners is reported considering an iron bridge across Dry Run at the west side of Bradley Park.

PITTSBURGH, PA.—Plans are reported being prepared by Superintendent Bruner, of the Engineering Bureau, for a new bridge to span the hollow at Lincoln avenue over the Grant boulevard. The old bridge is closed to traffic. The new structure will cost $150,000.

PORT LAVACA, TEX.—The House of Representatives has passed a bill authorizing Calhoun County to build a free bridge at Port Lavaca.

PROVIDENCE, R. I.—Several propositions for new bridges are under consideration by the city. Among the plans is one for a new structure over the Woonasquatucket River at Gaspee street, replacing the present wooden bridge.

Plans for a highway bridge across the Woonasquatucket River and the railroad to Pascoag, on the line of Eagan and Chatlett streets are awaiting action.

A new bridge over West River at Branch avenue is proposed.

The city and the New York, New Haven & Hartford have not agreed upon the date for abolishing grade crossings at Dyke, Grove and Acorn streets. Plans were made last year for the railroad to build an overhead bridge on the line with Teft street, a few yards from Acorn.

RAT PORTAGE, ONT.—It is reported that an iron bridge will be built over the East Branch of the Winnipeg River, near Rat Portage.

READING, PA.—The Philadelphia & Reading has let a contract to the Phoenix Bridge Co., to rebuild two spans of the Wilmington & Northern bridge over the Schuylkill River at Poplar Neck. The spans are 165 and 164 ft. long.

RICHMOND, MO.—W. A. Mullin informs us he wants specifications and estimates on nine highway bridges to be submitted to Ray County Court at the March term, as follows: Six 20-ft. spans, 12-ft. roadway, steel piers, and steel joists, piers from 10 to 15 ft. long; also three 30-ft. span bridges.

ST. JOSEPH, MICH.—The bill authorizing the Indiana, Illinois & Iowa R. R. to build a bridge across the St. Joseph River, at St. Joseph, Mich., passed both the House and Senate last week. (Jan. 4, p. 14; Jan. 18, p. 50.)

ST. THOMAS, ONT.—The Elgin County Council has agreed to pay half the cost of building a steel bridge over the River Thames on the town line between Dunwich and Aldborough.

STOCKTON, CAL.—Bids are wanted by the Supervisors, on March 5, with plans, for the proposed bridge at the Burneyville Ferry across the Stanislaus River.

SULLIVAN, IND.—J. M. Land, County Auditor, informs us that the County Commissioners will receive bids, on March 15, for three bridges of different construction, and of the following lengths: 120 ft., 110 ft., 50 ft. (Dec. 28, 1900, p. 867.)

THOMPSON, CONN.—The State Railroad Commissioners have ordered the elimination of three grade crossings in this town. The city has made an agreement with the railroad. (Dec. 28, 1900, p. 867.)

TURIN, N. Y.—The State Superintendent of Public Works informs us that no awards have been made for the bridges at Middleport and at Pratt's Landing, for which bids were received Feb. 15.

TWEED, ONT.—The County Council has decided to build a bridge over the Moira River on the boundary line near the city of Belleville.

WABASH, IND.—Bids are wanted by the County Commissioners, on April 1, for five bridges. B. F. Clemens, County Auditor.

WASHINGTON, D. C.—The Senate Committee on the District of Columbia has favorably reported a proposed amendment to the Sundry Civil Bill appropriating $200,000 to begin work on the Memorial Bridge across the Potomac River from the old Naval Observatory grounds to Arlington according to the recommendation of the Board of Architects and Army Engineers, approved by the Chief of Engineers and the Secretary of War. A number of petitions favoring the bridge have been sent to Congress from different parts of the country.

Other Structures.

AKRON, OHIO.—The Cuyahoga Iron & Steel Co. has been organized in this city to build a rod mill. The capital stock is $100,000. The officers are: President, S. H. Miller, of Doylestown; Vice-President, H. B. A. Kaiser, of Pittsburgh; and Treasurer, E. A. Henry, of Cuyahoga Falls, Ohio.

KANSAS CITY, MO.—The Chicago Great Western freight depot, at Central avenue and Wood street, was destroyed by fire on the night of Feb. 6. The building was two stories high, 50 x 350 ft.

KNOXVILLE, TENN.—The Southern Ry., according to report, will change the plans for the proposed depot at Knoxville, which is estimated to cost $70,000. Frank P. Milburn is the architect.

PROVIDENCE, R. I.—Fire, on Feb. 18, in the car sheds of the Union Railroad Company, at Elmwood, on the city limits, destroyed one of the buildings and 30 trolley cars, valued at $97,000. The total loss is estimated at $162,000.

PUEBLO, COLO.—The Colorado Fuel & Iron Co. is building a second large furnace at Pueblo to be 95 ft. high x 21 ft. in the bosh. John Mohr & Sons, of Chicago, have the contract for the boiler and plate work. The buildings, etc., are being put up by the American Bridge Co.

RED WING, MINN.—The Chicago, Milwaukee & St. Paul is considering building a new depot in the spring.

SAVANNAH, GA.—On Feb. 7, the shops and roundhouses of the Seaboard Air Line, in the suburbs, were partly destroyed by fire. Two locomotives were also destroyed.

TACOMA, WASH.—It is reported that the Great Northern will increase the capacity of the shops at Everett, Havre and at St. Paul.

WESTWEGO, LA.—The contract has been let by the Texas & Pacific to J. W. Thompson, of St. Louis, Mo., to build a 1,000,000-bushel grain elevator on the Mississippi River front at this place opposite New Orleans. The price is $350,000.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xi.)

American Society of Civil Engineers.

At the regular meeting, held at the Society House on Wednesday, a paper by G. N. Houston, Assoc. M. Am. Soc. C. E., entitled "The Construction of Gravity Sand Filters at Nyack, N. Y." (see December, 1900, *Proceedings*), was presented for discussion.

Engineering and Maintenance of Way Association.

The second annual convention of this Association is to be held in Chicago, March 12, 13 and 14, with headquarters at the Auditorium Hotel. The Executive Committee of the Road and Track Supply Association say that arrangements have been made for showing articles of interest to the Association and that there will be ample room for models and devices, but that it is doubtful if heavy articles can be shown to advantage. The Executive Committee would like to know at once what space will be required. Information can be addressed to J. Alexander Brown, Esq., 24 Park Place, New York City.

North-West Railway Club.

The regular monthly meeting of the North-West Railway Club was held in the West Hotel, Minneapolis, Wednesday evening, Feb. 13. Discussion was held on Mr. Burch's paper on "Electric Traction for Heavy Railroad Service," which was read at the January meeting, and was carried to some length, but owing to the limited time available at this meeting, and the desire on the part of many of the members to further consider the paper, it was decided to continue the discussion to the next meeting.

Mr. James Casey, Air-Brake Inspector of the "Soo Line," read a paper on "Lubrication of Locomotive Valves and Cylinders," and a paper on "The Principles of the Dynamo," was read by Prof. George D. Shepardson, of the University of Minnesota. Discussion was also held on Mr. Casey's paper. The occasion was marked by an unusually large attendance.

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. L. S. Palfrey, General Freight and Passenger Agent of the Austin & Northwestern Railroad, died at his home in Austin, Tex., Feb. 13. Mr. Palfrey was about 38 years old.

—Major Clinton B. Sears, Engineer Corps, U. S. A., who has been in charge of river and harbor improvements in Michigan, Minnesota and Wisconsin, has been ordered to proceed to Guam and Manila to superintend important engineering work at both places.

—Mr. Maurice Thompson, poet, story writer and novelist, died at Crawfordsville, Ind., Feb. 15. Few but his friends remember that he was by profession an engineer. Before he abandoned his profession for literature many years ago he wrote a series of articles for the *Railroad Gazette* on railroad surveys.

—Captain David Du B. Gaillard, Corps of Engineers, U. S. A., has been detached from duty as assistant to the Engineer Commissioner of the District of Columbia at Washington, and ordered to duty in charge of river and harbor improvement work in Minnesota, Wisconsin and Michigan, succeeding Major Clinton B. Sears. This work includes the improvement of the harbors of Duluth, Superior, Ashland, Marquette, the operation and care of the Portage Lake ship canals and work at several other points.

—Mr. G. W. Spencer, as noted some weeks ago, is the new Acting Superintendent of the Akron Division of the Baltimore & Ohio. He was born June 8, 1859, and began his railroad work as night operator for the Baltimore & Ohio on Jan. 1, 1876. He served as Train Despatcher at Newark, Ohio, from Aug. 1, 1881, and held a similar position on the New York, Chicago & St. Louis at Fort Wayne, Ind., from Dec. 1, 1886. He returned to the Baltimore & Ohio on Dec. 18, 1892, as Chief Despatcher at Garrett, Md. He became Trainmaster at the same point on May 1, 1897.

—Mr. E. G. Russell, who has just become Manager of the Operation of the Intercolonial, was born at St. George, N. B., in 1858. He began his railroad career in 1874, on the Minnesota & Northwestern, rising through the positions of telegraph operator, train despatcher, Assistant to the Superintendent until 1886, when he became Assistant General Superintendent. In April, 1888, he was appointed Assistant Superintendent of the Illinois Central, and while with that company was Superintendent of several of the Divisions, later becoming Superintendent of the Western Lines. Mr. Russell became Superintendent of the Rome, Watertown & Ogdensburg in February, 1893, being appointed to that position soon after the New York Central & Hudson River assumed operation of the line. In June, 1899, he was appointed General Superintendent of the Delaware, Lackawanna & Western, from which position he recently resigned.

—Mr. M. L. Morris is the new Engineer of Maintenance of Way on the Middle Division of the Chicago & Alton at Springfield, Ill. Mr. Morris was born near Rockville, Ind., Oct. 11, 1870. He took a course in civil engineering at the University of Michigan, and in 1893 began his railroad work as chainman on the Norfolk & Western during the building of the Ohio extension. He was with the Cleveland, Cincinnati, Chicago & St. Louis until January, 1899, serving as rodman and later as Supervisor of the Second District of the Michigan Division. He then became Engineer of the Peoria & Pekin Union at Peoria, Ill., and left that company on Dec. 15, 1899, to accept a position with the Chicago & Alton, his present company, as Assistant Engineer on the Eastern Division. He was transferred to the First District on April 15, 1900, as Supervisor. His appointment as Engineer of Maintenance of Way on the Middle Division took effect Jan. 1.

—Mr. S. K. Blair, whose appointment as Superintendent of the Western Division of the New York, Chicago & St. Louis at Fort Wayne, Ind., was recently noted, was born June 13, 1853. He began his railroad work on Jan. 2, 1872, as a telegraph operator at Sidney, Ohio, on the Cincinnati, Hamilton & Dayton. After serving at various points on that system, he was appointed Train Despatcher at Lima, Ohio, in the spring of 1876. Four years later he took service with the Toledo & Ohio Central at Bucyrus, Ohio, as Train Despatcher, and was later appointed Chief Train Despatcher of that line. He has been with the New York, Chicago & St. Louis, his present company, since Oct. 1, 1882, beginning as a Train Despatcher at Fort Wayne, Ind. In April of the following year he was made Chief Train Despatcher of the Western Division, and Trainmaster on June 1, 1888. His appointment as Superintendent of the same division takes effect March 1.

—Mr. William H. Stevenson, formerly Vice-President of the Housatonic Railroad, and prominent as a Democrat in Connecticut politics for many years, died at his home in Bridgeport on Sunday last at the age of 54. Mr. Stevenson began his railroad service in the general office of the Housatonic in 1864. He subsequently served on the New York & New Haven and the New York Central, and in 1874 was appointed Superintendent of the Shore Line. Eight years later he became Superintendent of the New York Division of the New York, New Haven & Hartford, and five years afterward (1887) was appointed Vice-President and General Manager of the Housatonic. This road was soon after affiliated with the New York & New England, and Mr. Stevenson held various positions in these and allied companies. He was President of the American Society of Railroad Superintendents for one term. Mr. Stevenson was admitted to the bar in 1878, and was at one time the legal officer of the city of Bridgeport. He also served as Alderman.

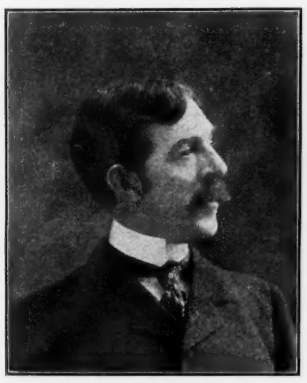
—Mr. Otto W. Meysenburg, of Chicago, well known through his connection with car building and other manufacturing interests, died of typhoid fever, Feb. 11, at Alma, Cal. Mr. Meysenburg was born in Germany in

1849 and his parents came to this country and settled in St. Louis when he was quite young. He early showed an inclination for mechanics and in time became prominent at St. Louis, being the builder of the first cable road in that city. Fifteen years ago Mr. Meysenburg moved to Chicago. There he founded the Siemens-Halske Electric Company, as a branch of the German company of that name, and for several years previous to 1896 acted as president. He was also largely interested in the Wells-French Car Works, and until 1899 was President and General Manager, only retiring in 1899, when that company passed into the hands of the American Car & Foundry Company. He was also President of the Rodger Ballast Car Company, from its organization about 12 years ago until the first of the present year. Mr. Meysenburg had practically retired from business and proposed to spend much of his time on his ranch at Alma, Cal.

—Mr. F. L. Pomeroy on Feb. 1 became the Assistant Traffic Manager of the New York Central & Hudson River at the Grand Central Station, New York city. He was born at Cortland, N. Y., Jan. 15, 1856, and began his railroad experience in 1872 as a clerk in the office of the Superintendent of the Ithaca & Cortland. Later he served in the Freight and Passenger Agent offices until 1877, during which time the road was merged into the Utica, Ithaca & Elmira. He was for a time General Freight and Passenger Agent of the Boston, Hoosac Tunnel & Western at North Adams, Mass., and on the Ogdensburg & Lake Champlain at Ogdensburg, N. Y. In 1884 he became General Freight and Passenger Agent of the Southern Central at Auburn, N. Y.; in 1885 General Freight Agent of the West Shore, and later Foreign Freight Agent in New York city for the Newport News & Mississippi Valley. He was General Agent of the Erie Despatch at Philadelphia in 1888 and 1889, and for four years General Eastern Freight Agent and General Freight Agent of the Erie in New York city. After managing the Freight Department of Downing & Co., of New York, until April, 1896, he became General Manager of the New York, Chicago & St. Louis at Buffalo; in March of the following year General Manager of the Red, White and Midland lines in the same city, and in October, 1898, General Manager of the New York Central Fast Freight Lines, in which position he continued until Feb. 1 last.

—Col. Peter Smith Michie, U. S. A. (Brevet Brig.-General, U. S. V.,), died at West Point, N. Y., Feb. 16, after a short illness from pneumonia. General Michie was born in Scotland in 1839, and was graduated from the Military Academy second in the class of 1863. He served during the last years of the Civil War in various positions and with distinction, and was Chief Engineer of the Army of the James at the end of the war. He had been on duty as a professor at West Point since 1871, and held the chair of Natural and Experimental Philosophy. He was a distinguished scientific man and the author of several works, including "Elements of Wave Motion Relating to Sound and Light," "Personnel of the Sea Coast Defense," "Elements of Hydro Mechanics," "Elements of Analytical Mechanics," "Practical Astronomy," "Life and Letters of Major General Emery Upton," etc. He had received the degrees of Ph. D. from Princeton and M. A. from Dartmouth. He was a member of the Century Club in New York, and of various learned societies. One of his sons, Lieut. Dennis Mahan Michie, was killed in the battle of San Juan Hill, in Cuba, and in February, 1899, another son died while serving as an Assistant Engineer in the employ of the Pennsylvania Railroad. General Michie was regarded by those who had an opportunity to know him, and to know of his work as possessing the highest qualities of a soldier, and had his career led to important field operations he would no doubt have distinguished himself as a General. He was a man of beautiful personal character, sincere, simple and courageous; a good example of the soldier-engineer.

—Mr. Palmer C. Ricketts has been made President of the Board of Trustees of the Rensselaer Polytechnic Institute, to succeed President John H. Peck, resigned. Mr. Ricketts was born in Elkton, Md., in 1856 and was graduated from the Rensselaer Polytechnic Institute in 1875. He at once took up duty in the Institute as Instructor in Mathematics and was made Assistant Professor of Mathematics in 1882. He became Professor of Rational and Technical Mathematics in 1884 and Director of the Institute in 1892. Mr. Ricketts has done a good deal of professional work parallel with his work in the Institute, a practice which is growing and which seems to us of the highest value to the institutions of learning inasmuch as it enables them to keep men of a higher grade than could otherwise be retained, and it keeps those men in close touch with practice. Mr. Ricketts has been Consulting Engineer for the Troy & Boston Railroad and for the Rome, Watertown & Ogdensburg, Engineer for the Public Improvements Commission of the City of Troy, and has done a good deal of other special work. He is Vice-President and a Director of the Trojan Car Coupler Company, Director of the Standard Railroad Signal Company and of the Chamber of Commerce of Troy. Among these activities he has still found time to write occasional papers for the Transactions of the American Society of Civil Engineers and for other societies and for the technical journals. He served a term as Director of the American Society of Civil Engineers in 1899 and 1900, and he has also served the Society on various committees. He is a member of the American Society of Mechanical Engineers and of the American Association for the Advancement of Science and other bodies. Under Mr. Ricketts' administration as Director the Institute has grown materially and he has won the confidence and warm regard of undergraduates and alumni. The Institute has a larger number of students than when Mr. Ricketts took up the office of Director, the equipment has greatly improved and the funds have been considerably increased. Of course he would not for a moment claim the credit for all of this improvement, but a share at least of it must be attributed to him. As the Institute gives but one engineering course the number of students is small as compared with those in other engineering schools, but the standard is very high and the "casualties" to freshmen are severe. By the time a student reaches the senior class he has gone through a serious course in natural selection. This famous Institute is by no means local as the freshmen list this year contains the names of students from 22 states of the Union, as well as from Cuba and South America, and the graduates are leading men in engineering and in business all over the world.



ELECTIONS AND APPOINTMENTS.

Albany & Hudson.—George G. Blakeslee has been appointed General Manager, succeeding Maurice Hoopes, resigned, effective March 1.

Chicago & Eastern Illinois.—Arthur M. Smith has been elected Secretary and Auditor, succeeding H. A. Rubidge, deceased. John J. Duck has been appointed Assistant Secretary, also Assistant Auditor, succeeding Mr. Smith.

Colorado Springs & Cripple Creek District.—D. C. McWaters has been made General Passenger Agent.

Columbus, Sandusky & Hocking.—J. E. Merion has been appointed Auditor, with headquarters at Columbus, Ohio, succeeding E. M. Fisher, resigned.

Denver & Rio Grande.—G. J. Gould was, on Feb. 14, elected a Director.

Great Northern.—C. E. Stone, heretofore Assistant General Passenger Agent of the Northern Pacific, has been appointed Assistant General Passenger Agent of the G. N., succeeding T. B. Lynch, resigned.

Gulf, Beaumont & Kansas City.—W. E. Maxson has been appointed Superintendent of this company and the Beaumont Wharf and Terminal Co.

Illinois Southern.—E. A. Burrill has been appointed Superintendent, succeeding the late H. W. Schmidt. Mr. Burrill is succeeded as General Freight and Passenger Agent by A. N. East.

Jamestown & Chautauqua.—J. F. O'Brien, at one time a division superintendent on the Erie, has been appointed General Manager. D. J. Bill has been appointed General Freight and Passenger Agent, succeeding J. S. Barrow, resigned, effective March 1.

Kansas City, Fort Scott & Memphis.—A. S. Dodge, heretofore General Traffic Manager of the St. Louis Southwestern, has been appointed General Traffic Manager of the K. C., F. S. & M., effective March 1. E. H. Thayer has been appointed Superintendent of Dining Car Service.

Kansas City Southern.—G. J. Gould (President Missouri Pacific) was, on Nov. 3, last, elected Vice-President of the K. C. S.

Kingston & Central Mississippi.—The officers of this company, referred to in the Construction column, are: President, L. L. Denson, Bay Springs, Jasper Co., Miss.; Vice-President, Edmund K. Stallo, Waldorf-Astoria, New York; Secretary and Auditor, A. Flanagan, Laurel, Miss.; Treasurer and General Manager, F. W. Pettibone, Laurel, Miss.; General Counsel, Torrey G. McCallum, Laurel; Purchasing Agent, L. Weitzel, Laurel; Superintendent and Chief Engineer, George Beckner, Laurel; General Freight and Passenger Agent, Ed. J. Harbin, Laurel.

New Orleans & Northwestern.—The officers of this company, controlled by the Missouri Pacific, are: President and Treasurer, C. G. Warner (Second Vice-President M. P.); Vice-President, R. Harding (Third Vice-President and General Manager M. P.); Secretary, J. W. Lambert, and Assistant Secretary, E. G. Merriam (Vice-President Arkansas & Louisiana); all with headquarters at St. Louis, Mo., except Mr. Lambert, who is at Natchez, Miss.

Northern Pacific.—E. E. Dildine has been appointed Assistant Superintendent of Telegraph, with headquarters at Tacoma, Wash.

Panama.—The title of Superintendent will hereafter be General Superintendent.

Portland, Nehalem & Tillamook.—At a meeting of the stockholders, held Feb. 2, the following officers were elected: President, Col. John McCraken; Vice-President, G. T. Myers, and Secretary and Attorney, William Reid. The Directors are: Col. John McCraken, George T. Myers, H. L. Pittock, William Fliedner, H. C. Campbell, H. S. Rowe, John Stewart, C. F. Pearson and William Reid. (See R. R. Construction column, Feb. 8, p. 104.)

Rutland.—At a meeting, held Feb. 13, H. G. Smith was elected Vice-President. O. F. Harrison succeeds Mr. Smith as Treasurer.

Wilmington Sea Coast.—E. S. Lattimer has been made Traffic Manager and J. H. Chadbourn, Jr., General Freight and Passenger Agent.

RAILROAD CONSTRUCTION.

New Incorporations, Surveys, Etc.

ALPENA & WESTERN.—This company was incorporated in Michigan, Feb. 15, with a capital stock of $1,000,000, to build the proposed line from Alpena west across the Northern Peninsula to Frankfort. Among the directors are: Robert Ray, of Hillman, Mich.; G. M. Babcock, of Atlanta; G. R. Lovejoy, of Mount Clemens; James Goodell, of Detroit; William C. Heath, of Detroit; Thos. N. Goodburne, of Detroit; William M. Marr, of Muskegon, and Delbert C. Morris, of Detroit. (Oct. 26, 1900, p. 711.)

ATCHISON, TOPEKA & SANTA FE.—An officer writes that there is no present intention of extending the Bartlesville branch, as reported, from Owasso, Ind. T., southwest to Tulsa. (Feb. 8, p. 103.)

An officer of the Gulf, Colorado & Santa Fe writes that so far as he is advised there is no truth in the report that the company will extend its line from San Angelo, Tex., west to Pecos City, as reported. (Feb. 1, p. 87.)

The San Francisco, Cal., Board of Supervisors has granted this company permission to place 12 tracks on the north side of Bryant street, and across Bryant street to the ferry slip and wharf in Main and Spear streets. (Jan. 18, p. 51.)

BALTIMORE & OHIO.—With reference to the $15,000,000 issue of bonds for improvements recently noted in the News column, President John K. Cowen is reported as saying that "the bulk of the work is now under way and includes second and third track, lowering of grades, building of cut-offs and some $8,000,000 to $9,000,000 of new equipment."

BATTLEFORD, FISH CREEK & LAKE LENORE.—This company is applying for a charter to build a railroad from a point on the Battle River in the District of Saskatchewan, at or near its junction with Cut Knife Creek, thence via Battleford and Fish Creek to Lake Lenore, thence to a point on the Canadian Northern near Crooked River; also to build a branch line from Fish Creek to Qu'Appelle station.

BAY & COAST.—New attempts are being made to obtain right of way through San Francisco for this proposed line from that city south about 100 miles. Wm. T. Baggett, of San Francisco, is attorney for the company. (Construction Supplement, July 27, 1900.)

BOTETOURT ELECTRIC RAILWAY & POWER.—Under this title an electric road is building from Fincastle, Va., south 20 miles to Roanoke. (Virginia Roads, Feb. 8, p. 104.) James Godwin, of Fincastle, Va., is President. (Official.)

CADIZ.—Application has been made in Kentucky for a charter for this company to build a railroad from Cadiz to connect with the Illinois Central and the Louisville & Nashville. The necessary funds have been raised and building will be begun as soon as the locating survey is made. The incorporators are: W. C. White, D. R. Grinter, K. R. McKee, G. S. Smith, J. D. Shaw, J. W. Crenshaw, all of Cadiz, and B. Armitage, of Philadelphia, Pa. (Official.)

CANADIAN PACIFIC.—Engineers are surveying for a new line in British Columbia from the coast eastward, which the company has power to build under a charter granted in 1875 from Abbotsford via Chilliwack to the line of the Columbia & Western Ry. The building of this line would block the construction of the Victoria, Vancouver & Eastern Ry., which is being surveyed. The following branch lines will be built and are now either surveyed or under survey: From Lardo to Selkirk, B. C., 55 miles; from Front Lake to Ferguson, B. C., 88 miles; from Okanagan Falls to Spences Bridge, 191 miles. This company during the year 1900 built nine different branch lines aggregating 139 miles, and is now building a branch from West Selkirk to Lake Winnipeg, 26 miles.

CENTRAL OF GEORGIA.—Building is to be begun at once, according to report, on the Bruton & Pineora extension from Register, Ga., east. It is to run to Statesboro, about 12 miles, connecting with Dover on the main line over the Dover & Statesboro, which has recently been bought by the C. of G. The contractors are: W. S. Wilson, Dothan, Ala.; Wright Bros., Montgomery, Ala.; Nichols & Cook, Macon; J. M. Sullivan, Columbus; Barned & Henderson, Georgia. (Jan. 4, p. 16.)

CHICAGO & NORTHWESTERN.—An officer advises that there is no truth in the report that his company is contemplating an extension of its Anamosa branch in Iowa. (Feb. 8, p. 103.)

CHICAGO & WESTERN.—This company was incorporated in Illinois, Feb. 12, with principal office at Chicago, to build a railroad from Chicago west to the city of Aurora. The incorporators and first board of directors are: G. M. O'Connell, George Gillette, Frederick W. Laas, Frederick A. Weil and John F. Cordial, all of Chicago.

CHICAGO, KALAMAZOO & SOUTHERN.—The proposed extension from Kalamazoo, Mich., southeast to connect with the Grand Trunk, will be built to Pavillion, so it is stated. Work will be begun at an early date and it is hoped to have the line completed by Aug. 1. (Dec. 21, 1900, p. 851.)

CHOCTAW, OKLAHOMA & GULF.—The general contractors for the extension from Weatherford, Okla. T., west 84 miles to the Texas line and toward Amarillo, Tex., are Johnson Bros. & Faught, of Philadelphia. Among the sub-contractors are L. W. Robinson, Rust & Smith, J. P. Murray, Grigsby Construction Co., P. H. Rogers, J. P. Powell and W. A. Shippey. (Feb. 15, p. 119.)

COLUMBUS, FINDLAY & TOLEDO, ELECTRIC POWER, FUEL & LIGHT.—This company was incorporated, Feb. 15, with a capital stock of $10,000, to build an electric line from Elyria south about 10 miles to Grafton. The central office is Larue.

EAST & WEST OF GEORGIA.—This company was incorporated in Georgia, Feb. 12, with a capital stock of $50,000, with the privilege of increasing to $150,000, to build a railroad from Sparta, Hancock County, to run south about 30 miles to Sandersville, Washington County. The general office is Sparta. The incorporators are: R. M. Mitchell, Atlanta; S. Reese, R. B. Baker, E. A. Rozier and Julious Manale, Sparta; John A. McCrarey, Charles V. Smith, John J. Lovett, Henry M. Carvero and William H. Smith, of Washington County, Ga.

ERIE.—The New Jersey House has passed the Senate bill extending the time for building the Pen Horn Creek open-cut across Bergen Hill in Jersey City for two years. (Construction Supplement, July 27, 1900.)

FINDLAY & NORTH BALTIMORE.—This company was incorporated in Ohio, Feb. 15, with a capital stock of $150,000, to build an electric railroad from Findlay north about 10 miles to North Baltimore. The headquarters are at Findlay.

FRENCH ROAD & SOUTHERN.—Representative Thompson, of Oconee, S. C., has called up his concurrent resolution in the South Carolina House of Representatives, to permit a bill to be introduced authorizing a charter for this company's line from Taxaway, N. C., to a point near Walhalla, S. C.

HOCKING VALLEY.—Track is nearly laid on the connecting line 1½ miles long at Walbridge, Ohio, joining this company's line with the Toledo & Ohio Central. (Feb. 15, p. 119.) No grading is required. (Official.)

INTERNATIONAL & GREAT NORTHERN.—The company is asking bids for an extension of 113 miles. For particulars see our advertising columns.

IRONDALE, BANCROFT & OTTAWA.—The company is asking for an extension of time to complete its lines and for power to buy or sell or lease to any connecting company. A deputation of county councillors from Haliburton went to Toronto and asked the Government to grant a bonus of $3,000 a mile for 12 miles of railroad from Irondale Junction to Minden Village, and were promised that it should be put in the supplementary estimates where the railroad bonuses are generally found.

JONESBORO, LAKE CITY & EASTERN.—The company has obtained an amendment to its charter for the extension from Blythesville, Ark., to Manila, 20 miles. (Construction Supplement, July 27, 1900.)

KINGSTON & CENTRAL MISSISSIPPI.—This company completed its final organization at Laurel, Miss., on Feb. 9. Application was made for a charter and con-

tract was closed for building 25 miles, which must be completed by Sept. 1. The road is projected from Laurel north 45 miles to Montrose. (Feb. 8, p. 104.) The officers are given under Elections and Appointments. (Official.)

LOUISVILLE & NASHVILLE.—The company has decided to build an extension of its Alabama & Florida line, recently completed from Andalusia, Ala., southeast 45 miles to Geneva. It is to run from Geneva southeast 45 miles more to Marianna, Fla., on another line of the L. & N. A bill was introduced into Congress some days ago authorizing a bridge across the Choctawhatchie River. (Construction Supplement, July 27, 1900.)

MISSOURI PACIFIC.—An officer writes that the project of a cut-off along the river from Jefferson City, Mo., northwest about 40 miles to Boonville is being considered but nothing has been determined. (Feb. 18, p. 104.)

MONTREAL & SOUTHERN COUNTIES.—A. J. Corriveau, Managing Director, is applying to the Dominion Parliament for an extension of time for the completion of the line and for power to secure the lease of other lines and to operate vessels.

NEWPORT, HARDWICK & MONTPELIER.—This company is being organized in Vermont to build a railroad from Newport, on the Canadian Pacific, to run southwest about 60 miles through the towns of Coventry, Irasburg, Albany, Craftsbury, Hardwick, Woodbury, Calais and East Montpelier to Montpelier. The original plan was to operate the line by electricity, but steam may be used. A committee has been formed to raise subscriptions. Among those interested are: O. C. Miller, Newport; W. H. Taylor, Hardwick; F. M. Corry, Montpelier; and G. L. Huntoon, Lowell, Mass.

PENNSYLVANIA.—Ryan & Kelly have taken a contract to lay a second track on the Shellpot cut-off near Edgemoor, Wilmington, Del., to be completed May 1.

See Philadelphia & Erie, under News.

PENNSYLVANIA & OHIO.—This company has increased its capital stock from $100,000 to $600,000 for building this proposed electric line from Ashtabula, Ohio, to Conneaut. The road is projected from Conneaut west via Ashtabula, Saybrook and Painesville to Geneva, there to make connection with the extension of the Cleveland, Painesville & Eastern. Building is in progress on the section from Conneaut Harbor to the city of Conneaut and westward.

PENNSYLVANIA COMPANY.—Bids are being received for the branch of the Western New York & Pennsylvania from near Volant, Pa., to limestone quarries near Leesburg, 13 miles. (Jan. 11, p. 34.)

PHILADELPHIA & READING.—A contract is reported let to P. McManus, of Philadelphia for grading and masonry work on additional tracks at West Lebanon, Pa.

The company has also let a contract, according to report, to Chas. Nolan for grading and masonry work on the third track between Birdsboro and Monocacy, Pa.

PORTLAND CITY & OREGON.—This company filed articles of incorporation in Oregon, Feb. 1, with a capital stock of $500,000, to own and operate railroad, telegraph and power lines from a point near the northern limits of Portland, to run south on both sides of the Willamette River to Oregon City. The headquarters are at Portland. The incorporators are: Fred S. Morris, W. H. Hurlburt and J. Frank Watson.

SHASTA, TRINITY & HUMBOLDT.—This company has been organized to build a railroad from Eureka, Cal., east about 100 miles through the counties named in the title to a connection with the Southern Pacific in Sacramento Valley. The directors are: Geo. H. Proctor, J. A. Simmons, Henry B. Twombley and A. P. Morrison, all of New York; William R. A. Wilson, of Peoria, Ill., and Henry Brace, of Eureka. Platt & Bayne are the company's representatives in San Francisco, and J. H. Weaver in Eureka. Surveys will be begun soon, according to report, at both ends of the line.

SUWANEE & SAN PEDRO.—The company has called for bids for a drawbridge on its proposed extension. (Nov. 23, 1900, p. 784.) Frank Drew, of Mayo, Fla., is General Manager. (Official.)

TOLEDO SOUTHERN.—This company was incorporated in Ohio, Feb. 13, with a capital stock of $25,000, to build an electric railroad from Toledo, Ohio, south to Dayton. The incorporators are: Ben F. James, George A. Smith, C. R. Painter, L. F. Donely and Jonathan E. Ladd.

TYLER.—This company, whose incorporation was noted last week (p. 120), is to build an electric line from Sistersville, W. Va., to West Union, 25 miles. Building is to be begun soon on the section between Sistersville and Middlebourne. J. W. McCoy, of Sistersville, is a director.

WAPAKONETA & KENTON TRACTION.—This company was incorporated in Ohio, Feb. 15, with a capital stock of $5,000, to build an electric railroad from Wapakoneta northeast about 30 miles to Kenton. The central office is Columbus.

WESTPOINT, URBANA & YORKTOWN.—This company is seeking incorporation before the Virginia Legislature for a line from Toano, on the Chesapeake & Ohio, to run north about 10 miles to a point on the York River, opposite Westpoint, where connection will be made with the steam ferry. The incorporators are: T. B. Henley and W. W. Woodward, of Newport News; Lyon G. Tyler, of Williamsburg, and J. C. Robinson, of Hampton.

YALAHA & WESTERN.—Grading is nearly finished and track laying in progress on this line from Okahumpa, Fla., to the American Kaolin Works, at Yalaha, 10 miles. T. L. Marquis has the contract. There are 60 men at work. There will be one trestle of 200 ft. Elmer T. Haines, of Leesburg, Fla., is President. (Feb. 8, p. 104.) Chas. D. Haines, 21 Park Row, New York, is interested. (Official.)

GENERAL RAILROAD NEWS.

ATCHISON, TOPEKA & SANTA FE.—The company has petitioned the California Board of Railroad Commissioners for permission to abandon its Redondo Beach line of the Southern California from Redondo to Santa Monica, 10.78 miles.

BALTIMORE & OHIO SOUTHWESTERN.—Judge Thompson, in the United States Circuit Court at Cincinnati, Ohio, Feb. 16, ordered an entry terminating the receivership of this property and restoring it to the directors. The receivers are directed to appear in any litigation that may arise out of transactions during their receivership. (Dec. 14, 1900, p. 834.)

BEECH CREEK (NEW YORK CENTRAL & HUDSON RIVER.)—The annual report of the Philadelphia & Erie, a subordinate line of the Pennsylvania, shows that the company has made an agreement with the directors of the Beech Creek whereby the P. & E. will build a second track between Keating and McElhattan, 46 miles, which is to be used by the Beech Creek at an annual rental of $60,000. The improvements will require an expenditure of $500,000.

CINCINNATI, JACKSON & MACKINAW.—The securities of the successor companies were sold at auction on Feb. 13 for the Reorganization Committee for $1,043,140. (Feb. 8, p. 104.)

DENVER & RIO GRANDE.—Mr. Geo. J. Gould has been elected a director of the D. & R. G., indicating that the "unity of interest" idea is being extended among the Western roads. President E. T. Jeffery made the following statement just prior to this election:

A controlling interest in the property has not been bought by any other railroad company, nor has its independence as a Colorado railroad been in the slightest degree impaired by any recent changes that have taken place in the holdings of its securities. The great prosperity of the State of Colorado and its large increase in the output of the precious metals has attracted the attention of investors and capitalists, among them George J. Gould, who has purchased an important interest in the company, and who will, on Thursday, enter its directory for the purpose of participating in the management of the property and the further development of Colorado, with which he has long been personally identified. The policy that has heretofore governed the management will continue, not only in relation to the public and the State at large, but with all connecting lines with which it has heretofore had commercial relations.

DENVER & SOUTHWESTERN.—Dunscomb & Jennison, New York, offer $100,000 of the company's general mortgage 5 per cent. sinking fund gold bonds, due Nov. 1, 1929, at a price to yield about 5⅜ per cent. (March 16, 1900, p. 178.)

GRAND TRUNK.—The company has leased the Cincinnati, Jackson & Mackinaw for 99 years.

GULF, BEAUMONT & KANSAS CITY.—Application is being made to the Texas Legislature by the Gulf, Colorado & Santa Fe to take over this property recently bought. The proposition is also made to consolidate the Beaumont Wharf & Terminal, but it is understood that that proposition is not included in the bill. (July 27, 1900, p. 518.)

HOCKING VALLEY.—The New York Stock Exchange has listed $719,000 additional preferred stock to enable the Middle States Construction Co. to make additions to the Toledo & Ohio Central, to procure equipment and make improvements on the property. Of the Toledo & Ohio Central there remain to be acquired $12,099 of preferred stock, and $54,577 common stock. The Exchange has also listed $1,000,000 additional first mortgage consolidated 100-year 4½ per cent. gold bonds of 1999, the proceeds of which are to be used for additions and betterments.

JAMESTOWN, CHAUTAUQUA & LAKE ERIE.—This company, incorporated Sept. 25, 1900, has acquired over 75 per cent. of the $250,000 bonds, and over 90 per cent. of the $475,000 stock of the Jamestown & Chautauqua; also the entire $260,000 stock of the Chautauqua Steamboat Company, which operates 11 steamboats on Chautauqua Lake. An extension is building from Mayville to Westfield, 11 miles, which it is expected will be ready for operation about April 15. A mortgage has been made to the Continental Trust Co., New York, as trustee, to secure $750,000 50-year 4 per cent. gold bonds. The new company has $600,000 capital stock outstanding and a like amount of bonds which mature Jan. 1, 1951. With the completion of the extension, the total mileage will be 41 miles. (Railroad Construction, Dec. 7, 1900, p. 818.)

KANSAS CITY SOUTHERN.—The fact has recently developed that George J. Gould, President of the Missouri Pacific, was on Nov. 3, 1900, elected Vice-President of the K. C. S. He was already a member of the voting trust.

LAKE ERIE, ALLIANCE & WHEELING.—Garfield, Garfield & Howe, Garfield Building, Cleveland, Ohio, are representatives of a syndicate formed in that city which has issued a prospectus for the floating of securities amounting to about $7,000,000. It is proposed to complete a railroad under the above title from Fairport, Lake County, on Lake Erie, to run south about 125 miles to Bridgeport, opposite Wheeling, W. Va. The syndicate has bought the first mortgage bonds of the Ohio River & Lake Erie, and has a controlling interest in the Alliance & Northern. It is now negotiating with the minority holders of the A. & N. for their shares at $35. These purchases give a line from Phalanx on the Erie south through Alliance to Bergholz, and right of way has been obtained for a connecting line south. The Wheeling, Alliance & Lake Erie Coal Co. is another organization of the syndicate which owns coal lands to be tapped by the proposed line. (Railroad Construction, Feb. 1, p. 88; A. & N., Feb. 8, p. 104.)

MARYLAND & PENNSYLVANIA.—This company has been formed, with a capital stock of $3,600,000 and an equal amount of bonds, to take over the consolidated Baltimore & Ohio and the York Southern. Of the common stock, $600,000 is to be exchanged for York Southern, dollar for dollar; $725,000 to be distributed as a bonus to subscribers to first mortgage bonds and income bonds, and the rest to be reserved for future requirements, including bankers' commissions. Of the bonds, $2,700,000 will be first mortgage 50-year gold 4s, subject to call at 105 and interest, at any interest period on 60 days' notice. The remaining $900,000 will be income gold 4 per cent. cumulative bonds subject to call at 100 on 60 days' notice. These bonds together with $550,000 of the first mortgage bonds, will be used to pay for the 8,500 shares of the Baltimore & Lehigh at $70 per share and its floating debt; also for $150,000 York Southern 5 per cent. bonds at par and interest and its floating debt; also for expenses of consolidation, etc.; $250,000 is reserved to provide at maturity for the retirement of $249,950 York & Peach Bottom 5 per cent. bonds, and the remaining $1,950,000 first mortgage bonds is reserved for future acquirements. Subscriptions have been received for $550,000 of the first mortgage bonds at $900, and $900,000 of the income bonds at $700 per bond. The syndicate reserves the right to sell prior to July 1 at 95 and 75 respectively. The combined gross earnings of the two companies for the year ended June 30, 1900, were $237,781, and the net earnings $76,021. Interest charges on the proposed issue of bonds by the new company will be $70,500, leaving a surplus on the basis of last year's income of $5,521. (York Southern, Feb. 8, p. 104; Baltimore & Lehigh, Feb. 15, p. 120.)

MISSISSIPPI RIVER, HAMBURG & WESTERN.—An officer of the Missouri Pacific denies that his company has taken control of the Mississippi River, Hamburg & Western, as recently reported. (Feb. 15, p. 120.)

MISSOURI, KANSAS & TEXAS.—The New York Stock Exchange has listed $200,000 additional first mortgage 50-year 5 per cent. guaranteed gold bonds of the M., K. & T. of Texas, to be used on the 10 miles of completed extension from San Marcos, Tex., toward San Antonio. (Railroad Construction, Sept. 7, 1900, p. 602.)

MOBILE & OHIO.—The Attorney-General of Mississippi advises the State Railroad Commission that the Southern Railway has transgressed the state law as to competing lines in purchasing the Mobile & Ohio. It is understood that the case will be contested in the courts.

The Attorney-General of Illinois has given an opinion pronouncing the acquisition of the M. & O. legal under the laws of that state. (Feb. 8, p. 104.)

NASHVILLE & KNOXVILLE.—Press reports from Tennessee state that the Tennessee Central has obtained a controlling interest in this property.

NORTHERN PACIFIC.—For particulars of the lease of this company's lines in Manitoba to the Canadian Northern see our editorial columns.

PENNSYLVANIA COMPANY.—Kuhn, Loeb & Co. offer the $10,000,000 3½ per cent. 40-year gold trust bonds, guaranteed by the Pennsylvania R. R., recently acquired by them at 101 and accrued interest. Subscription books will be opened at 10 a. m., Feb. 20, and closed at 3 p. m., or earlier the same day. (Feb. 8, p. 104.) The following quotations are from a letter of A. J. Cassatt, President of the Pennsylvania lines.

"These certificates are issued by the Girard Trust Company, formerly the Girard Life Insurance, Annuity and Trust Company, of Philadelphia, Pa., and are secured by the obligation of the Pennsylvania Co. and by pledge with the Girard Trust Co., of Philadelphia, trustee, of 100,000 shares of the 7 per cent. guaranteed special stock of the Pittsburgh, Fort Wayne & Chicago Ry. Co., aggregating at par $10,000,000, and having a market value of almost double this amount, and by the guarantee of the Pennsylvania R. R. Co. The certificates are dated Feb. 1, 1901, and mature Feb. 1, 1941, interest being payable on Feb. 1 and Aug. 1 in each year. . . . .

"These certificates are issued pursuant to an agreement dated Sept. 1, 1897, between the Pennsylvania Co., the Pennsylvania R. R. Co. and the Girard Life Insurance, Annuity and Trust Co. of Philadelphia, trustee, providing for the issue by the trustee of not exceeding $20,000,000 Pennsylvania Co. guaranteed trust certificates, whereof certificates series A, aggregating $5,000,000, were issued in September, 1897.

"The Pennsylvania Co. has covenanted and agreed that, until these trust certificates shall be fully paid, it will not exercise its voting power as a stockholder of the Pittsburgh, Fort Wayne & Chicago Ry. Co., to increase the bonded debt of that company beyond the amount of bonded debt now existing, and that it will not vote any stock of the Pittsburgh, Fort Wayne & Chicago Ry. Co., owned by it, in favor of reducing the dividend below 7 per cent. per annum on the guaranteed special stock of the company pledged to secure the within mentioned issue of trust certificates."

RAILROAD SECURITIES COMPANY.—This company, which was incorporated in New Jersey some months ago, with a capital stock of $20,000,000, of which $7,500,000 is 4 per cent. cumulative preferred, is understood to be allied with the Harriman Syndicate, including E. H. Harriman, Kuhn, Loeb & Co., and others, in the control of the Chicago & Alton, the Kansas City Southern, the Union Pacific and the Southern Pacific. The company is organized to acquire and hold the securities of any railroad or railroads believed to be a good investment, and has already bought $8,000,000 of Illinois Central stock. This stock is pledged to secure a like amount of 3½ per cent. 50-year gold bonds, due Jan. 1, 1951, part of the authorized issue limited to $10,000,000. Of the authorized stock there is outstanding $2,000,000 preferred and $3,600,000 common.

READING.—The company has recently sold at par and interest $1,300,000 Wilmington & Northern collateral stock 4 per cent. trust certificates, guaranteed by the Reading and issued by the Girard Trust Co., against practically the entire $1,500,000 capital stock of the W. & N. These certificates are redeemable at maturity. The stock is guaranteed 3 per cent. per annum by the P. & R. under a 999-year lease.

The collateral trust 4 per cents to be issued on account of the purchase of the majority stock of the Central of New Jersey will be for the total authorized sum of $45,000,000. Of this $23,000,000 will be issued at once, to pay for the stock at $160, and the remainder reserved to acquire minority stock. The Pennsylvania Company for Insurances on Lives and Granting Annuities, as trustee, will hold as security the following collateral: Central of New Jersey, $14,500,000 capital stock (cost $23,200,000); Perkiomen stock, $1,495,000; Port Reading stock, $440,000. The new 4s are due April 1, 1951, interest semi-annually, but are subject to call on April 1, 1906, and thereafter at 105 and interest on six months' notice. They will be offered at 92½ and interest. (Feb. 8, p. 104.)

RICHMOND & WASHINGTON AIR LINE (SEABOARD AIR LINE.)—Both branches of the Virginia Legislature, at Richmond, on Feb. 12, passed bills canceling the charter granted last session to this company. The effect of this action, so it is stated, will be to return to John Skelton Williams, President of the S. A. L., his check and bond aggregating $125,000, and to withdraw the request for bids on the State's holdings of the Richmond, Fredericksburg & Potomac. The intention of the S. A. L. is, according to Mr. Williams, that his road and others connected with it, acquire a controlling interest in the R., F. & P.

SOUTH ST. PAUL BELT.—The transfer of this property to the new owners represented by John R. Hastings was effected Feb. 15. The purchase is said to be in the interest of the Burlington, Cedar Rapids & Northern. (Feb. 8, p. 104.)

TEXARKANA, SHREVEPORT & NATCHEZ.—According to press reports the Texas & Pacific took possession of this property at noon Feb. 8. The line runs from Texarkana, Ark., to Shreveport, La., 72 miles, and is projected to Natchez, Miss., about 200 miles in all. (Feb. 1, p. 88.)

TOLEDO, ST. LOUIS & KANSAS CITY.—The Olcott committee gives notice to holders of certificates of deposit issued by the Central Trust Co., New York, for the preferred and common stock that the committee is prepared to deliver the securities of the Toledo, St. Louis & Western, the successor company, under the plan of reorganization. (Feb. 15, p. 120.)